LIMBACH & LIMBACH L.L.P.
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A/#

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Docket No. SONY-C5757
Anticipated Classification of this Application:
Class: 360
Subclass:
Prior Application:
Examiner: V. BOCCIO
Art Unit: 2604

CONTINUATION OR DIVISIONAL APPLICATION UNDER 37 CFR 1.60

Box Patent Application
Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

CERTIFICATION UNDER 37 CFR 1.10

I hereby certify that this New Application and the documents referred to as enclosed herein are being deposited with the United States Postal Service on this date September 3, 1997, in an envelope bearing "Express Mail Post Office To Addressee" Mailing Label Number TB82353248XUS addressed to: Box Patent Application, Assistant Commissioner for Patents, Washington, D.C. 20231.

HOWARD WONG (Signature)
(Name of person mailing paper)

This is a request for filing a [X] continuation [] divisional application under 37 CFR 1.60, of pending prior application no. 08/563,188 filed on November 27, 1995 of SHIGEAKI KOIKE ET AL. for DATA RECORDING AND REPRODUCING APPARATUS.

1. [X] Enclosed is a **COMPLETE COPY** of the prior application, including the oath or declaration as originally filed. A declaration verifying it as a true copy appears in ¶23 below. (See ¶13 for drawing requirements.)

2. Name of applicant(s) (as originally filed and as last amended) and current correspondence address of applicant(s):

SHIGEAKI KOIKE, c/o Sony Corporation, 7-35, Kitashinagawa 6-chome, Shinagawa-ku, Tokyo, Japan
YASUO IWASAKI, c/o Sony Corporation, 7-35, Kitashinagawa 6-chome, Shinagawa-ku, Tokyo, Japan

3. [X] This application discloses and claims only subject matter disclosed in the prior application whose particulars are set out above and the inventor(s) in this application are
[X] the same
[] less than those named in the prior application and it is requested that the following inventor(s) identified above for the prior application be deleted:

4. [X] The inventorship for all the claims in this application are
[X] the same

[] not the same, and an explanation, including the ownership of the various claims at the time the last claimed invention was made, is submitted.

5. [] A verified statement to establish small entity status under 37 CFR 1.9 and 1.27 [] is enclosed [] was filed in the prior application no. filed on and such status is still proper and desired (37 CFR 1.28(a)).

6. [X] The filing fee is calculated below:

CLAIMS AS FILED IN THE PRIOR APPLICATION LESS ANY CLAIMS CANCELLED BY AMENDMENT BELOW

CLAIMS AS FILED						
	CLAIMS REMAINING AFTER AMENDMENT OF ¶10	CLAIMS ADDED BY PRELIMINARY AMENDMENT OF ¶11	**TOTAL CLAIMS FILED**	NUMBER EXTRA*	RATE	BASIC FEE $770
Total Claims	1	8	9	-20 = 0	× 22 =	$ 0
Independent Claims	1	1	2	-3 = 0	× 80 =	$ 0
__ FIRST PRESENTATION OF MULTIPLE DEP CLAIM					+260 =	$ 0
					TOTAL	$ 770
				Small Entity 50% Filing Fee Reduction (if applicable)		$ 0

* If the difference is less than zero, enter "0."

7. [X] A check in the amount of $770 is enclosed.

8. AUTHORIZATION TO CHARGE **ADDITIONAL** FEES

[X] The Commissioner is hereby authorized to charge the following **ADDITIONAL** fees which may be required by this paper and during the entire pendency of this application to Account No. 12-1420. The Commissioner is hereby authorized to charge payment of any fees associated with this communication or credit any overpayment to Deposit Account No. 12-1420. **A duplicate copy of this sheet is enclosed.**

- [X] 37 CFR 1.16 (filing fees)
- [X] 37 CFR 1.16 (presentation of extra claims)
- [X] 37 CFR 1.16(e) (surcharge for filing the basic filing fee and/or declaration on a date later than the filing date of the application)
- [X] 37 CFR 1.17 (application processing fees)
- [] 37 CFR 1.18 (issue fee at or before mailing of Notice of Allowance, pursuant to 37 CFR 1.311(b)).

9. INSTRUCTIONS AS TO OVERPAYMENT

- [X] credit Account No. 12-1420
- [] refund

10. [X] Cancel in this application original Claims 2-7 of the prior application before calculating the filing fee. (At least one original independent claim must be retained for filing purposes).

11. [X] A preliminary amendment is enclosed. (Claims added by this amendment have been properly numbered consecutively beginning with the number next following the highest numbered originally claimed in the prior application.)

12. [X] RELATE BACK - 35 USC 120: Amend the specification by inserting before the first line the sentence:

--This is a [X] continuation [] divisional of Application no. 08/563,188, filed November 27, 1995.--

[Note to form user: lines for item 12 are intentionally spaced to permit Examiner amendments.]

13. DRAWINGS
- [] Transfer the drawings from the prior application to this application and abandon said prior application as of the filing date accorded this application. A duplicate copy of this sheet is enclosed for filing in the prior application file. (May only be used if signed by person authorized by 37 CFR 1.138 and before payment of base issue fee.)
- [X] New formal drawings are enclosed.

14. PRIORITY
- [X] Priority of application no. P06-293556 filed on November 28, 1994 in Japan is claimed under 35 USC 119.
- [X] The certified copy of the priority application has been filed in prior application no. 08/563,188 filed on March 11, 1996.

15. ASSIGNMENT
- [X] The prior application is assigned of record to Sony Corporation, 7-35, Kitashinagawa 6-Chome, Shinagawa-ku, Tokyo, JAPAN;
  Assignment recorded in PTO on March 11, 1996, Reel 7902 Frame(s) 0343.
- [] The prior application is assigned, and the assignment (copy attached) was submitted to PTO for recording on _.
- [] An assignment of the invention to is attached. A copy of Form PTO-1595 (Recordation Cover Sheet) is also attached.

16. [X] The power of attorney in the prior application is to the members of the firm of Limbach & Limbach, now known as LIMBACH & LIMBACH L.L.P., 2001 Ferry Building, San Francisco, California, 94111, including Charles P. Sammut, Reg. No. 28,901.
- a. [X] The power appears in the original papers in the prior application.
- b. [] Since the power does not appear in the original papers, a copy of the power in the prior application is enclosed.
- c. [] A new power has been executed and is attached.
- d. [X] Address all future communications to LIMBACH & LIMBACH L.L.P., Attn: Charles P. Sammut, 2001 Ferry Building, San Francisco, California, 94111.

17. STATEMENT UNDER 37 CFR 3.73(B) (certification of title in assignee, if applicable, see MPEP 324)
- [] A statement satisfying the requirements of 37 CFR 3.73(b)
  - [] is attached.
  - [] was filed in the prior application.
  - [] A copy of the statement previously filed in the prior application is attached.

18. [X] An Information Disclosure Statement is enclosed with Form PTO-1449 (modified).

19. [] Enclosed is a Statement Requesting Deletion of Names of Persons Who are No Longer Inventors.

20. MAINTENANCE OF COPENDENCY OF PRIOR APPLICATION
(This item must be completed and the necessary papers filed in the prior application if the period set in the prior application has run).
- [] A petition, fee and response has been filed to extend the term in the pending prior application until _.
  - [] A copy of the petition for extension of time in the prior application is attached.

21. CONDITIONAL PETITIONS FOR EXTENSION OF TIME IN PRIOR APPLICATION
(Complete this item and file conditional petition in prior application if previous item (20) not applicable).
- [] A conditional petition for extension of time is being filed in the pending prior application.
- [] A copy of the conditional petition for extension of time in the prior application is attached.

22. ABANDONMENT OF PRIOR APPLICATION

[] Please abandon the prior application at a time while the prior application is pending or when the petition for extension of time or to revive in that application is granted and when this application is granted a filing date so as to make this application copending with said prior application.

23. [X] I hereby verify that the **attached papers are a true copy of prior complete application** no. 08/563,188 and no amendments referred to in the oath or declaration filed to complete the prior application introduced new matter therein.

The undersigned declares further that all statements made herein of his or her own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

LIMBACH & LIMBACH L.L.P.

By: _____

Charles P. Sammut
Registration No. 28,901
Attorney(s) or Agent(s) of Record

September 3, 1997
(Date)

(S95P757US00)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of	Group Art Unit: 2604
SHIGEAKI KOIKE ET AL.	Examiner: V. BOCCIO
Continuation of Appln. No. 08/563,188	PRELIMINARY AMENDMENT
Filed: September 3, 1997	
For: DATA RECORDING AND REPRODUCING APPARATUS	2001 Ferry Bldg. San Francisco, CA 94111 Ph.: 415-433-4150

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

Please preliminarily amend the above identified application as follows:

In the Specification

Page 2, line 22, please change "expensive in cost" to --expensive--;

Page 4, line 13, please change "in the" to --in a--;

Page 11, line 5, please change "12." to --12 on which a tape 110 is mounted.--;

Page 11, line 11, please change "32," to --32 which includes an optical system 320 and MO disc 300,--;

Page 16, line 16, please change "camera" to --camera (not shown)--;

Page 16, line 22, please change "line through" to --line, through--;

Page 16, line 24, please change "rate or" to --rate, or--;

Page 18, lines 17, 20, 23, page 20, lines 3, 5, please change "recording" to --memory storage--;

Page 19, line 14, please change "202" to --300--;

Page 23, line 7, please change "12 was" to --12 is--;

Page 25, line 16, please change "circuit)" to --circuit) 442--;

Page 27, lines 11, 12, please change "inner code processing circuit 190" to --channel code encoder circuit 160--;

Page 28, line 12, please change "to the" to --to a recording amplifier 140 of--;

Page 28, line 15, please change "by the" to --by a playback amplifier 142 of--;

Page 28, line 19, please change "from the" to --from an auxiliary playback amplifier 146 of--;

Page 28, line 22, please change "by a" to --by the--;

Page 28, line 23, please change "and a" to --and the--;

Page 28, line 23, please change "amplifier" to --amplifiers--;

Page 28, line 24, please change "AUXPBA)" to --AUXPBA) 142-146--;

Page 31, line 24, please change "from the" to --from an--;

Page 32, line 1, change "prevents" to —prevent--;

Page 32, line 13, change "recording capacity" to —storage capacity--;

Page 33, line 20, please change "Figure 4 is a view showing" to --Figures 4A and 4B are views illustrating--;

Page 34, lines 1, 11, please change "recording capacity" to --storage capacity--;

Page 35, line 1, please change "prevent" to --prevents--;

Page 35, line 21, please change "speed detection sensor" to --speed detection sensor 121_6--;

Page 35, line 21, please change "phase detection sensor" to --phase detection sensor 121_5--;

Page 35, line 22, please change "circuit" to --circuit 122_1--;

Page 35, line 23, please change "circuit" to --circuit 122_2--;

Page 35, line 24, please change "circuit" to --circuit 122_4--;

Page 35, line 24, please change "amplifier" to --amplifier 122_{11}--;

Page 36, line 2, please change "sensor" to --sensor 121_4--;

Page 36, line 3, please change "sensor" to --sensor 121_7--;

Page 36, line 3, please change "circuit" to --circuit 122_5--;

Page 36, line 4, please change "circuit" to --circuit 122_6--;

Page 36, line 5, please change "detection" to --detection circuit 122_7--;

Page 36, line 6, please change "amplifier" to --amplifier 122_{12}--;

Page 36, line 8, please change "sensors" to --sensors 121_2, 121_3--;

Page 36, line 9, please change "circuit" to --circuit 122_9--;

Page 36, line 9, please change "sensor" to --sensor 121_1--;

Page 36, line 10, please change "detection circuit" to --detection circuit 122_{10}--;

Page 36, line 10, please change "control circuit, and a" to --control circuit 122_{14}, and--;

Page 36, line 11, please change "amplifier" to --amplifiers 122_{13}, 122_{15}--;

In the Claims

Please add the following new claims 8-15:

--8. A video data recording and reproducing system for editing a source video data;

a video tape recording means for recording a source video data onto a tape medium with a first data rate during a recording period and for reproducing recorded source video data from said tape medium with a second data rate which is higher than said first transfer rate to generate reproduced video data;

a disc recording means for recording said reproduced video data onto a disc medium with said second data rate so that said source video

data is copied from said tape medium to said disc medium during a transfer period which is shorter than said recording period of said source video data;

an editing means for controlling a reproducing operation of said disc recording means to generate an edited video data comprises a plurality of edit portions which is designated by an editing operation from said source video data recorded on said disc recording means.

9. The video data recording and reproducing system according to claim 8,

wherein said editing means controls said reproducing operation of said disc recording means so that said edited video data is reproduced from said disc medium with said first or second data rate.

10. the video data recording and reproducing system according to claim 8,

wherein said editing means cartels said reproducing operation of said disc recording means so that said edited video data is reproduced from said disc medium with said second data rate and controls said recording operation of said video tape recording means so that said edited video data reproduced from said disc recording means is recorded on tape medium with said second data rate.

11. The video data recording and reproducing system according to claim 8,

wherein said editing means controls said reproducing operation of said disc recording means so that said edited video data is reproduced from said disc medium with said first data rate and controls said recording operation of said video tape recording means so that said edited video data reproduced from said disc recording means is recorded on tape medium with said first data rate.

12. The video data recording and reproducing system according to claim 11,

wherein said first data rate is a real time video data rate.

13. The video data recording and reproducing system according to claim 8,

wherein said video tape recording means has a first operation mode for recording said video data with said first data rate and for reproducing said video data with said first data rate and a second operation mode for recording said video data with said second data rate and for reproducing said video data with said second data rate;

wherein said disc recording means has a first operation mode for recording said video data with said first data rate and for reproducing said video data with said first data rate and a second operation mode for recording said video data with said second data rate and for reproducing said video data with said second data rate;

wherein said editing means controls said operation mode of said video tape recording means and said operation mode of said disc recording means.

14. The video data recording and reproducing system according to claim 8 further comprising,

a transfer means for transferring said reproduced video data reproduced from said video tape recording means and said edited video data reproduced from said disc recording means.

15. The video data recording and reproducing system according to claim 8 further comprising,

an input/output means for receiving said source video data and for outputting said edited video data.--

In the Drawings

The Examiner is requested to approve the proposed drawing changes noted in red on the enclosed sketches. A separate Letter to the Official Draftsman is enclosed.

REMARKS

The above changes conform the specification to the drawings and/or correct typographical errors, and to add new claims 8-15.

The Examiner's early examination and consideration are respectfully requested.

Respectfully submitted,

LIMBACH & LIMBACH L.L.P.

By: [signature]

Charles P. Sammut
Reg. No. 28,901

September 3, 1997
Our File: SONY-C5757

EXPRESS MAIL CERTIFICATE

I hereby certify that this correspondence and any documents referred to as enclosed herein are being deposited with the United States Postal Service on this date September 3, 1997, in an envelope bearing *"Express Mail Post Office To Addressee"* Mailing Label Number TB82353248XUS *addressed to:* Box Patent Application, Assistant Commissioner for Patents, Washington, D.C. 20231.

HOWARD WONG
(Name of person mailing paper)

[signature]
(Signature)

 Express Mail Number EB823532248XUS

DATA RECORDING AND REPRODUCING APPARATUS

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a data recording and reproducing apparatus which records and reproduces a digital audio and/or visual (video) signal.

2. Description of the Related Art

In general, for editing work of video data, audio data, etc., there has been adopted the method of connecting a plurality of VTR apparatuses (video tape recorders), reproducing the video data etc. by the respective VTR apparatuses to find the required video images, and connecting the located plurality of video data to one video data.

When the editing of the video data is carried out by using the above-mentioned method, however, it suffers from the disadvantages that the VTR apparatus can perform basically only a sequential access and, in addition, a long time is taken for the editing work since the data transfer rate when a plurality of video data are connected to one video data is restricted by the reproduction data rate of the VTR apparatus.

Further, there has been a demand for enabling editing

of the video data etc. at the site where news was shot. However, sometimes it is not possible to provide a number of VTR devices at the camera site and therefore it is not possible to meet this demand in many cases. On the other hand, even if a plurality of VTR devices can be provided, it greatly reduces the mobility of the news crew it they have to carry a plurality of VTR devices together with the camera equipment.

Moreover, also in a case where the edited video data etc. are to be transferred, it suffers from the disadvantages that the transmission data rate is restricted by the reproduction data rate of the VTR device, the transmission can be carried out only with a low transmission data rate, and the method of transmission of the video data from the camera site to the broadcast station is restricted. It is not impossible to change the reproduction data rate of the VTR device to any value in accordance with the transmission data rate. However, it suffers from the disadvantage in that such a VTR device would have to be a special one which has a more complex structure than the usual VTR device and is more expensive in cost.

SUMMARY OF The INVENTION

The present invention was made in consideration with

the above-mentioned disadvantages of the related art and has as an object thereof to provide a data recording and reproducing apparatus which does not require a plurality of VTR devices for performing the editing work of video data and can easily perform the editing of the video data even at the camera site.

Another object of the present invention is to provide a data recording and reproducing apparatus which has a simple structure and is inexpensive in cost while making the reproduction data rate variable.

Still another object of the present invention is to provide a data recording and reproducing apparatus in which the recording and reproduction data rate and the transmission data rate are variable and which can enhance the efficiency of the editing work by improving the transfer data rate when a plurality of video data are connected to one video data.

Moreover, another object of the present invention is to provide a data recording and reproducing apparatus which can transmit the video data obtained as a result of editing at a plurality of transmission data rates and has little restrictions in the method of transmission.

So as to achieve the above-mentioned objects, the data recording and reproducing apparatus of the present invention is characterized in that a disc recording and

reproducing means, a tape recording and reproducing means, a data transfer means, a first input/output means, and a second input/output means are integrally assembled; the disc recording and reproducing means records audio and/or visual data including audio-data, and video-data, audio-data or video-data, i.e. audio and/or visual data, transferred from the data transfer means in a disc recording medium to which random access is possible and reproduces the audio and/or visual data from the disc recording medium and outputs the same to the data transfer means; the tape recording and reproducing means records the audio and/or visual data transferred from the data transfer means in the tape recording medium and reproduces the audio and/or visual data from the tape recording medium and outputs the same to the data transfer means; the data transfer means transfers the audio and/or visual data among any of the elements selected from among the disc recording and reproducing means, the tape recording and reproducing means, the first input/output means, and the second input/output means; the first input/output means receives an analog audio and/or visual signal from an outside apparatus, converts the same to audio and/or visual data of a digital format, and outputs the same to the data transfer means and converts the audio and/or visual data

transferred from the data transfer means to an audio and/or visual signal of the analog format and outputs the same to an outside apparatus; and the second input/output means receives audio and/or visual data from a communication line connected to an outside apparatus and outputs the same to the data transfer means and outputs the audio and/or visual data transferred from the data transfer means to a communication line connected to an outside apparatus.

The disc recording and reproducing means is for example a magneto-optic (MO) disc device and records and reproduces the audio and/or visual data with respect to a disc recording medium such as an MO disc medium to which random access is possible.

The tape recording and reproducing means is for example a VTR device and records and reproduces the audio and/or visual data with respect to the tape recording medium such as a video tape recording medium to which substantially only a sequential access at a plurality of reproduction data rates is possible.

The data transfer means transfers the audio and/or visual data in any direction among a disc recording and reproducing means, the tape recording and reproducing means, and the input/output means, that is, for example, a direction from the disc recording and reproducing means

to the tape recording and reproducing means and an inverse direction thereof and a direction from the disc recording and reproducing means to the tape recording and reproducing means and the input/output means and, at the same time, adjusts the timing of input/output of the audio and/or visual data among them.

The first input/output means converts audio and/or visual data transferred from the data transfer means to an audio and/or visual image signal of an analog format and outputs the same to an outside apparatus and converts an audio and/or visual image signal received from an outside apparatus to digital audio and/or visual data and outputs the same to the data transfer means.

The second input/output means transmits or receives the audio and/or visual data between the data transfer means and a predetermined digital communication line.

In the data recording and reproducing apparatus according to the present invention, by accommodating these constituent parts in one housing, the portability is enhanced and the usefulness at the location of voice and video images is enhanced.

Preferably, the disc recording and reproducing means records audio and/or visual data which was reproduced from the tape recording medium by the tape recording and reproducing means and transferred by the data transfer

means and the audio and/or visual data which was received by the first input/output means and the second input/output means and transferred by the data transfer means in the disc recording medium and the tape recording and reproducing means records the audio and/or visual data which was reproduced from the disc recording medium by the disc recording and reproducing means and the audio and/or visual data which was received by the first input/output means and the second input/output means and transferred by the data transfer means in the tape recording medium.

Preferably, the data transfer means has an input buffering means performing the buffering of the audio and/or visual data input from the disc recording and reproducing means; an output buffering means performing the buffering of the audio and/or visual data which is transferred to the disc recording and reproducing means; and a recording and reproduction control means controlling each of the reproduction operation and recording operation of the disc recording and reproducing means in accordance with respective remaining recording capacities of the input buffering means and the output buffering means.

Preferably, the recording and reproduction control means starts the reproduction operation of the disc

recording and reproducing means where the remaining storage capacity of the input buffering means becomes larger than a predetermined value and stops the reproduction operation of the disc recording and reproducing means where the remaining storage capacity of the input buffering means becomes a predetermined value or less.

Preferably, the tape recording means reproduces the audio and/or visual data at the data rate with which the data transfer means receives the audio and/or visual data and records the audio and/or visual data at the data rate with which the data transfer means transfers the audio and/or visual data.

Preferably, the first input/output means has a digital/analog conversion means for converting the audio and/or visual data of a digital format from the data transfer means to an audio and/or visual signal of an analog format and outputting the same to an outside apparatus and an analog/digital conversion means for converting an audio and/or visual signal of an analog format from an outside apparatus to audio and/or visual data of a digital format and outputting the same to the data transfer means.

Preferably, the second input/output means has a data output means for converting audio and/or visual data of a

parallel format from the data transfer means to audio and/or visual data of a serial format and outputting the same to a predetermined communication line of the outside apparatus and a data reception means for receiving audio and/or visual data of a serial format from a predetermined communication line of an outside apparatus and converting the same to audio and/or visual data of a parallel format and outputting the same to the data transfer means.

BRIEF DESCRIPTION OF THE DRAWINGS

The above and other objects and features of the present invention will be more apparent with reference to the accompanying drawings, in which:

Fig. 1 is a view showing the configuration of a data recording and reproducing apparatus according to the present invention;

Fig. 2 is a view showing a recording track on a video tape shown in Fig. 1;

Fig. 3 is a view showing a detailed configuration of the data recording and reproducing apparatus according to the present invention shown in Fig. 1;

Fig. 4A and 4B are views showing control of an operation of an MO disc device by a buffer control circuit shown in Fig. 3;

Fig. 5 is a view showing the configuration of a tape running system of the VTR device shown in Fig. 1 and Fig. 3; and

Fig. 6 is a view showing the configuration of the MO disc device shown in Fig. 1 and Fig. 3.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

First embodiment

A first embodiment of the present invention will be explained.

Figure 1 is a view showing the configuration of a data recording and reproducing apparatus 1 according to the present invention.

Figure 2 is a view showing a recording track 112_i (i is an integer) on a video tape 110 shown in Fig. 1.

First, an explanation will be made of the configuration of the data recording and reproducing apparatus 1 and the operation of the respective constituent elements.

As shown in Fig. 1, the data recording and reproducing apparatus 1 is constituted by a VTR portion 10, a video interface circuit (video IF circuit) 24, an MO disc portion 30, a data transfer circuit 40, a digital interface circuit (digital IF circuit) 44, and a control circuit (CPU) 50.

Note that the constituent parts of the data recording and reproducing apparatus 1 are integrally accommodated in one housing 5 so as to give convenience in carrying and handling.

The VTR portion 10 is constituted by a VTR device 12, a REC amplifier (record/playback: REC/PB amplifier) 14, a channel modulation and decoding circuit (channel code ENDEC) 16, and an error correction code generating/error correction circuit (ECC circuit) 18.

The MO disc portion 30 is constituted by an MO disc device 32, a laser control circuit 34, a channel modulation and decoding circuit 36, and an ECC circuit 38.

Note that, in actuality, due to the control by the control circuit 50, the constituent elements of the VTR portion 10 and the MO disc portion 30 and the control circuit 50 are connected by control signal lines, but these are omitted for simplification of the illustration.

In the VTR portion 10, the VTR device 12 performs the recording and reproduction of audio and/or visual data including audio-data and video-data, audio-data, or video data, i.e. audio and/or video data of a digital format with respect to the video tape 110. The VTR portion 10 has two operation modes of, for example, normal recording and reproduction and high speed recording and

reproduction, and outputs the audio and/or visual data at two recording and reproduction rates corresponding to the operation modes.

Where the reproduction data rate is changed and the audio and/or visual data is reproduced from the video tape 110, the speed of feeding the video tape 110 and the rotational speed of the recording and reproduction head are changed. Further, as shown in Fig. 2, it is sufficient so far as the VTR device 12 is controlled so that a combined vector $\underline{c}$ of a vector a expressing the speed of advance of the video tape 110 and a vector $\underline{b}$ indicating the path of the recording and reproduction head where the video tape 110 is stopped follows the recording track 112_1 of the video tape 110.

The REC amplifier 14 drives the recording head of the VTR device 12 when recording digital audio and/or visual data on the video tape 110 and amplifies the reproduction signal from the VTR device 12 when reproducing audio and/or visual data from the video tape 110.

The channel modulation and decoding circuit 16 matches the characteristic of the recording and reproduction system (not illustrated) of the VTR device 12 and the characteristic of the audio and/or visual data input and output between the ECC circuit 18 and the channel modulation and decoding circuit 16 so as to make

efficient recording and reproduction possible.

The ECC circuit 18 adds the error correction code (ECC) to the audio and/or visual data input from the signal processor 20 and performs the error correction thereof by using the ECC contained in the audio and/or visual data input from the channel modulation and decoding circuit 16.

The signal processor 20 has a switching circuit, an analog/digital conversion circuit, and a digital/analog conversion circuit, etc., converts the digital audio and/or visual data input from the ECC circuit 18 or the data transfer circuit 40 to an analog audio and/or visual signal and outputs the same to the video IF circuit 24, and converts an analog audio and/or visual signal input from the video IF circuit 24 to digital audio and/or visual data and outputs the same to the ECC circuit 18 or the data transfer circuit 40.

The video IF circuit 24 outputs the audio and/or visual image signal (AOUT) input from the signal processor 20 to an outside apparatus and outputs the audio and/or visual signal (AIN) input from an outside apparatus to the signal processor 20.

In the MO disc portion 30, the MO disc device 32 performs the recording and reproduction of the digital audio and/or visual data with respect to the MO disc 300.

The laser control circuit 34 controls the output of the laser diode (not illustrated) of the optical system 320 of the MO disc device 32.

The channel modulation and decoding circuit 36 matches the characteristic of the optical system 320 of the MO disc device 32 and the characteristic of the audio and/or visual data input and output between the ECC circuit 38 and the channel modulation and decoding circuit 36 so as to make efficient recording and reproduction possible.

The ECC circuit 38 adds the error correction code (ECC) to the audio and/or visual data input from the data transfer circuit 40 and performs the error correction thereof by using the ECC contained in the audio and/or visual data input from the channel modulation and decoding circuit 36.

The data transfer circuit 40 performs the buffering of the audio and/or visual data input from the signal processor 20 or the ECC circuit 38 and outputs the same to the signal processor 20, ECC circuit 38, or the digital IF circuit 44.

That is, the data transfer circuit 40 transfers the audio and/or visual data reproduced by the VTR device 12 to the MO disc device 32, the video IF circuit 24, and the digital IF circuit 44 according to the control of the

control circuit 50 based on the operation data and transfers the audio and/or visual data reproduced by the MO disc device 32 to the VTR device 12, the video IF circuit 24, and the digital IF circuit 44.

The digital IF circuit 44 outputs the audio and/or visual data input from an outside apparatus to the data transfer circuit 40 at a designated transmission data rate (DOUT) and outputs audio and/or visual data (DIN) input from an outside apparatus to the data transfer circuit 40 at a designated transmission data rate.

The control circuit 50 controls the operation of the constituent elements of the data recording and reproducing apparatus 1 according to the operation information input from an outside apparatus. Also, as explained referring to the first embodiment, where a buffer memory is used in place of the data transfer circuit 40, the control circuit 50 monitors the empty storage capacity of this buffer memory and controls the recording and reproduction operation etc. of the VTR device 12 and the MO disc device 32 so that an overflow will not occur.

Note that, in the data recording and reproducing apparatus 1, the MO disc device 32 corresponds to the disc recording and reproducing means according to the present invention; the MO disc 300 corresponds to the

disc recording medium according to the present invention; the VTR device 12 corresponds to the tape recording and reproducing means according to the present invention; the video tape 110 corresponds to the tape recording medium according to the present invention; the signal processor 20 and the data transfer circuit 40 correspond to the data transfer means according to the present invention; and the video IF circuit 24 and the digital IF circuit 44 respectively correspond to the first input/output means and second input/output means according to the present invention.

Below, the operation of the data recording and reproducing apparatus 1 will be explained.

The video IF circuit 24 of the data recording and reproducing apparatus 1 has connected to it, for example, a video camera which inputs the analog audio and/or visual image signal to the data recording and reproducing apparatus 1 and a monitor device (not illustrated) which displays the audio and/or visual data output from the data recording and reproducing apparatus 1. The digital IF circuit 44 has connected to it, for example, a communication line through which the audio and/or visual data is transmitted at the predetermined transmission data rate or the transmission device. The control circuit 50 receives as input operation information from the

operator of the data recording and reproducing apparatus 1.

The analog audio and/or visual signal is sequentially input to the video IF circuit 24 from the video camera connected to the data recording and reproducing apparatus 1.

According to the control of the control circuit 50, the audio and/or visual signal input to the video IF circuit 24 is converted to digital audio and/or visual data, the data is subjected to predetermined processing by the signal processor 20, the ECC is added by the ECC circuit 18, and the result is input to the VTR device 12 via the channel modulation and decoding circuit 16 and the REC amplifier 14. In the VTR device, recording is carried out on the inserted video tape 110 at the recording data rate of normal recording and reproduction.

When the input of the audio and/or visual image signal is ended, the operator of the data recording and reproducing apparatus 1 makes the VTR device 12 reproduce the audio and/or visual data at the reproduction data rate of high speed recording and reproduction and, at the same time, inputs operation information indicating that the audio and/or visual data reproduced by the VTR device 12 has been recorded at the recording data rate of the high speed recording and reproduction to the MO disc

device 32.

The control circuit 50 controls the constituent parts of the data recording and reproducing apparatus 1 according to this operation information.

The VTR device 12 reproduces the audio and/or visual data from the video tape 110 at the transfer data rate of the high speed recording and reproduction and outputs the same to the ECC circuit 18 via the REC amplifier 14 and the channel modulation and decoding circuit 16.

The ECC circuit 18 sequentially corrects the error of the input audio and/or visual data, and the signal processor 20 makes the data transfer circuit 40 sequentially store the audio and/or visual data after the error correction.

Here, for example, where a buffer memory is used instead of the data transfer circuit as mentioned above, the control circuit 50 monitors the remaining recording capacity of the data transfer circuit and controls the VTR device 12 to stop the reproduction of the audio and/or visual data where the remaining recording capacity becomes a predetermined value or less and restart the reproduction of the data of the VTR device 12 where the remaining recording capacity becomes larger than a predetermined value.

The ECC circuit 38 adds the ECC to the audio and/or

visual data stored in the data transfer circuit. The audio and/or visual data to which the ECC was added is input via the channel modulation and decoding circuit 36 and the laser control circuit 34 to the MO disc device 32 and sequentially recorded on the MO disc 300.

Below, an explanation will be made of the method of editing of the audio and/or visual data using the data recording and reproducing apparatus 1.

When the above operation is ended, the operator of the data recording and reproducing apparatus 1 inputs operation information designating a reproduction position of the MO disc 300.

The MO disc device 32 reproduces the audio and/or visual data at the position on the MO disc 202 which was designated and outputs the same to the ECC circuit 38 via the laser control circuit 34 and the channel modulation and decoding circuit 36.

The ECC circuit 38 corrects the error of the input audio and/or visual data. The error-corrected audio and/or visual data is sequentially stored in the data transfer circuit.

The control circuit 50 monitors the remaining storage capacity of the data transfer circuit in the same way as the case where the audio and/or visual data is input from the signal processor 20 to the data transfer circuit and

controls the MO disc device 32 to stop the reproduction of the audio and/or visual data where the remaining recording capacity becomes a predetermined value or less and restarts the reproduction of the data of the MO disc device 32 where the remaining recording capacity becomes larger than a predetermined value.

The digital IF circuit 44 sequentially reads out the audio and/or visual data from the data transfer circuit and displays the same on the monitor device.

The operator of the data recording and reproducing apparatus 1 repeatedly designates reproduction positions and confirms the video images on the monitor device to find the necessary video images and makes the VTR device 12 record the found audio and/or visual data on the video tape 110 at the recording data rate of the high speed recording and reproduction so as to perform the editing work.

Note that, in this case, when the reproduction speed of the MO disc device 32 is made faster than the recording speed of the VTR device 12, the audio and/or visual data which is input to the MO disc device 32 is not interrupted, therefore this is preferable.

Also, as another method of editing, a method may be adopted wherein the operator inputs operation information designating an order of reproduction of the recorded

audio and/or visual data and a range thereof to the MO disc 300, the MO disc device 32 reproduces the audio and/or visual data from the MO disc 300 according to this operation information, and the VTR device 12 records this audio and/or visual data.

There are cases where the video data obtained by the above editing work is carried to the broadcast station via the video tape 110 and cases where the video data is transmitted to the broadcast station etc. via a communication line.

Below, an explanation will be made of the operation of the data recording and reproducing apparatus 1 when a transmission device is connected to the digital IF circuit 44 and the audio and/or visual data is transmitted.

The operator performs the above-mentioned operation to move the edited audio and/or visual data from the video tape 110 to the MO disc 300 in the data recording and reproducing apparatus 1.

Further, the operator inputs the operation information for transmitting the audio and/or visual data from the digital IF circuit 44 to the data recording and reproducing apparatus 1.

The MO disc device 32 reads out the recording signal from the MO disc 300 and outputs the same to the laser

control circuit 34. The reproduced recording signal is input to the data transfer circuit via the laser control circuit 34, the channel modulation and decoding circuit 36, and the ECC circuit 38 and stored.

The digital IF circuit 44 sequentially outputs the audio and/or visual data input from the data transfer circuit 40 at a transmission data rate suited to the connected transmission device.

Also at this time, the control circuit 50 controls the reproduction of the audio and/or visual data of the MO disc device 32 so as not to allow overflow etc. in the data transfer circuit (buffer memory) 40.

As mentioned above, according to the data recording and reproducing apparatus 1, the VTR device 12 and the MO disc device 32 are integrally constituted, and therefore it is possible to perform the editing work by using only the data recording and reproducing apparatus 1. Accordingly, editing of the audio and/or visual data can be easily carried out at the camera site.

Also, in the data recording and reproducing apparatus 1, even if the VTR device 12 is not constituted so that reproduction at any reproduction data rate is possible, the digital audio and/or visual data can be transmitted in accordance with the transmission data rate. Accordingly, a VTR device having a general configuration

can be used as the VTR device 12 used in the data recording and reproducing apparatus 1.

Also, since it is possible to perform the data transfer between the video tape 110 and the MO disc 300 at a high speed during the editing work, the efficiency of the editing work rises.

Note that the VTR device 12 was constituted so as to record and reproduce audio and/or visual data at two types of recording and reproduction data rates, but it is also possible to further increase the type of the recording and reproduction data rates of the VTR device 12.

Moreover, it is also possible to constitute the data recording and reproducing apparatus 1 so as to use another random accessable recording device, for example, an HD device, in place of the MO disc device 32.

Further, it is also possible to omit part of the constituent elements of the data recording and reproducing apparatus 1 in accordance with the purpose of the data recording and reproducing apparatus 1 or to further add constituent elements having other functions.

Also, it does not suffer from the disadvantage if the constituent elements of the data recording and reproducing apparatus 1 are realized by hardware means or realized by software means.

Moreover, it is also possible to include a monitor device in the housing 5 in the data recording and reproducing apparatus 1 and constitute the data recording and reproducing apparatus 1 so that the audio and/or visual data reproduced by the VTR recording and reproducing device 12 and the MO disc recording and reproducing device 32 or the audio and/or visual data received by the video IF circuit 24 and the digital IF circuit 44 can be displayed to the user.

In addition to the explanation in the first embodiment, the data recording and reproducing apparatus of the present invention can adopt various configurations as in for example the modifications mentioned here.

Second embodiment

In the second embodiment, a further detailed configuration and operation of the data recording and reproducing apparatus 1 shown in Fig. 1 as the first embodiment will be explained.

Figure 3 is a view showing a detailed configuration of the data recording and reproducing apparatus 1 according to the present invention shown in Fig. 1. Note that, in Fig. 3, the same constituent parts as those of Fig. 1 are indicated by the same references.

As shown in Fig. 3, the video IF circuit 24 is constituted by an A/D conversion circuit 240 and a D/A

conversion circuit 242.

The A/D conversion circuit 240 converts the audio-video signal AIN of an analog format supplied from an editing device of an outside apparatus, camera, etc. to audio and/or visual data of a digital format and outputs the same to the signal processor 20.

The D/A conversion circuit 242 converts audio and/or visual data of a digital format input from the signal processor 20 to an audio and/or visual image signal AOUT of an analog format and outputs the same to an editing device connected to an outside apparatus and a monitor device (not illustrated) etc.

The digital IF circuit 44 is constituted by a serial/parallel conversion circuit (S/P conversion circuit) 440 and a parallel/serial conversion circuit (P/S conversion circuit).

The S/P conversion circuit 440 receives audio and/or visual data DIN of a serial format which is input from a communication line, converts the same to a parallel format, and outputs it to the signal processor 20.

The P/S conversion circuit 442 converts audio and/or visual data of a parallel format input from the signal processor 20 to audio and/or visual data DOUT of a serial format and transmits the same onto the communication line.

The signal processor 20 is constituted by a TBC (time base corrector) buffer circuit 200, a selector circuit (SEL) 202, and an MPEG processing circuit 204.

The TBC buffer circuit 200 performs the buffering of the audio and/or visual data synchronized to a clock signal including jitter, which was input from the video IF circuit 24 and the digital IF circuit 44, synchronizes the same with the normal clock signal, and outputs the resultant signal to the selector circuit 202.

The selector circuit 202 selects either of the audio and/or visual data input from the TBC buffer circuit 200 and the selector circuit 404 according to the control of the control circuit 50 and outputs the selected signal to the MPEG processing circuit 204.

The MPEG processing circuit 204 processes the audio and/or visual data input from the selector circuit 202 according to need according to the control of the control circuit 50. That is, where non-compressed audio and/or visual data is input, this non-compressed audio and/or visual data is subjected to compression and encoding processing by a compression and encoding system such as for example an MPEG 2 system and where compressed audio and/or visual data is input, this compressed audio and/or visual data is subjected to expansion and decoding processing.

The audio and/or visual data processed by the selector circuit 202 is output to the selector circuit 402 and an ECC encoder 180 of the ECC circuit 18.

The ECC circuit 18 is constituted by the ECC encoder (ECCE) 180, inner code processing circuits (INNER) 190 and 192, a TS buffer circuit (TSBuff) 194, and outer code processing circuits (OUTER) 196 and 198.

The ECC encoder 180 adds the inner code and outer code to the audio and/or visual data input from the MPEG processing circuit 204 of the signal processor 20 and outputs the resultant signal to the inner code processing circuit 190.

The inner code processing circuits 190 and 192 perform the error correction by using the inner code added to the audio and/or visual data which was reproduced from the video tape 110 by the VTR device 12 and channel code-decoded by the channel modulation and decoding circuit 16 and outputs the resultant signal to the TS buffer circuit 194.

The TS buffer circuit 194 performs the buffering of the audio and/or visual data whose error was corrected by the inner code processing circuits 190 and 192 and outputs the resultant signals to the outer code processing circuits 196 and 198.

The outer code processing circuit 196 performs the

error correction by using the outer code added to the audio and/or visual data input from the TS buffer circuit 194 and outputs the resultant signal to the data transfer circuit.

The channel modulation and decoding circuit 16 is constituted by a channel code encoder circuit (CCE circuit) 160, channel code decoder circuits (CCD circuits) 162 and 164, and a TBC circuit 166.

The CCE circuit 160 modulates the audio and/or visual data input from the ECC encoder 180 of the ECC circuit 18 to produce the recording signal and outputs the resultant signal to the REC amplifier 14.

The CCD circuits 162 and 164 demodulate the recording signal which was reproduced by the VTR device 12 and amplified by the REC amplifier 14 to produce the audio and/or visual data and outputs the same to the inner code processing circuits 190 and 192 of the ECC circuit 18.

The TBC circuit 166 performs jitter compensation of the recording signal input from the REC amplifier 14 in the same way as the TBC buffer circuit 200 and outputs the resultant signal to the data transfer circuit 40.

The REC amplifier 14 is constituted by a recording amplifier (RA) 140 and a reproduction amplifier (PBA, AUXPBA).

The recording amplifier 140 amplifies the recording

signal input from the CCE circuit 160 of the channel modulation and decoding circuit 16 and outputs the amplified signal to the VTR device 12.

The reproduction amplifiers 142, 144, and 146 respectively amplify the recording signal reproduced by the VTR device 12 and output the amplified signals to the CCD circuits 162 and 164 of the channel modulation and decoding circuit 16 and the TBC circuit 166.

Note that, the REC amplifier 14 of the data recording and reproducing apparatus 1 and the channel modulation and decoding circuit 16 provide three systems of circuits, that is, a digital system circuit, an analog system circuit, and an AUX series, as the circuits for reproduction. That is, for example, as the inner code processing circuit 190 and the outer code processing circuit 196 of the ECC circuit 18, the CCD circuit 162 of the channel modulation and decoding circuit 16 and the reproduction amplifier 142 of the REC amplifier 14 are used as the digital system circuit; the inner code processing circuit 192 and the outer code processing circuit 198 of the ECC circuit 18, the CCD circuit 164 of the channel modulation and decoding circuit 16, and the reproduction amplifier 144 of the REC amplifier 14 are used as the analog system circuit; and the reproduction amplifier 146 of the REC amplifier 14 and the TBC circuit

166 of the channel modulation and decoding circuit 16 are used as the AUX circuit.

The reason that the REC amplifier 14 and the channel modulation and decoding circuit 16 provide both a digital system circuit and an analog system circuit is to prepare for the case where an audio and/or visual-image signal of an analog format is recorded on the video tape 110 in addition to the recording of the audio and/or visual data of the digital format on the video tape 110.

Also, the AUX circuit is used for reproducing the auxiliary data (AUX data) recorded on the video tape 110 together with the audio and/or visual data (recording signal).

The ECC circuit 38 is constituted by an ECC encoder (ECCE) 380 and an ECC (ECCD) decoder 382.

The ECC encoder 380 adds the ECC to the audio and/or visual data input from the data transfer circuit 40 and outputs the resultant data to the channel modulation and decoding circuit 36.

The ECC decoder 382 performs error correction by using the ECC contained in the audio and/or visual data reproduced by the MO disc device 32 and demodulated by the channel modulation and decoding circuit 36 and outputs the resultant signal to the data transfer circuit 40.

The channel modulation and decoding circuit 36 is constituted by a CCE circuit 362 and a CCD circuit 364.

The CCE circuit 362 modulates the audio and/or visual data input from the ECC encoder 380 of the ECC circuit 38 to produce the recording signal and outputs the same to the laser control circuit 34.

The CCD circuit 364 demodulates the recording signal which is input from the laser control circuit 34 and outputs the demodulated signal to the ECC decoder 382 of the ECC circuit 38.

The data transfer circuit 40 is constituted by selector circuits 402 and 404, a buffer control circuit (BCONT) 410, a recording buffer circuit (WBuff) 412, a reproduction buffer circuit (RBuff) 414, and a video processor circuit (VPR) 420.

The selector circuit 402 selects either of the audio and/or visual data input from the MPEG processing circuit 204 or the outer code processing circuits 196 and 198 of the ECC circuit 18 according to the control of the control circuit 50 and outputs the selected signal to the video processor circuit 420 and the recording buffer circuit 412.

The selector circuit 404 selects either of the audio and/or visual data input from the SDI input circuit 462 or the reproduction buffer circuit 414 according to the

control of the control circuit 50 and outputs the selected signal to the selector circuit 202 and the video processor circuit 420.

The recording buffer circuit 412 performs the buffering of the audio and/or visual data input from the selector circuit 402 and outputs the resultant data to the ECC encoder 380 of the ECC circuit 38.

The reproduction buffer circuit 414 performs the buffering of the audio and/or visual data input from the ECC decoder 382 of the ECC circuit 38 and outputs the resultant data to the selector circuit 404.

The buffer control circuit 410 monitors the remaining recording capacity of the recording buffer circuit 412 and the reproduction buffer circuit 414 when the MO disc device 32 records and reproduces the audio and/or visual data and controls the reproduction operation and recording operation of the MO disc device 32 so that the recording buffer circuit 412 and the reproduction buffer circuit 414 will not overflow.

The video processor circuit 420 performs predetermined processing with respect to the audio and/or visual data input from the selector circuit 402, the TBC circuit 166 of the channel modulation and decoding circuit 16, and the selector circuit 404, for example processing relating to the adjustment of the signal

level, superimpose processing, and character insertion processing, and outputs the resultant signal to the D/A conversion circuit 242 of the video IF circuit 24, the P/S conversion circuit 442 of the digital IF circuit 44, and the SDI output circuit 460.

The SDI output circuit 460 improves on the SDI (serial data interface: SM PTE-259M) system or SDI system for the audio and/or visual data input from the video processor 420 according to the control of the control circuit 50 and transmits the resultant audio and/or visual data to a transmission path of an SDDI (serial digital data interface) system through which the transmission of the audio and/or visual data subjected to the variable length compression and encoding was made possible.

The SDI input circuit 462 receives the audio and/or visual data transmitted via the transmission path of the SDI system etc. and outputs the same to the selector circuit 404.

Figure 4 is a view showing the control of operation of the MO disc device 32 by the buffer control circuit 410 shown in Fig. 3.

As shown in Figs. 4A and 4B, the buffer control circuit 410 starts the reproduction operation of the MO disc device 32 (reproduction operation starting

processing) where the remaining recording capacity of the reproduction buffer circuit 414 becomes a predetermined lower limit setting or less when the MO disc device 32 performs the reproduction operation and stops the reproduction operation of the MO disc device 32 (reproduction operation stopping processing) where the remaining storage capacity becomes a predetermined upper limit setting or more.

Also, the buffer control circuit 410 starts the reproduction operation of the MO disc device 32 where the remaining recording capacity of the recording buffer circuit 412 becomes a predetermined lower limit setting or less when the MO disc device 32 performs the recording operation and stops the reproduction operation of the MO disc device 32 where the remaining storage capacity becomes a predetermined upper limit setting or more. In this way, the buffer control circuit 410 prevents overflow from occurring in at least the recording buffer circuit 412 and the reproduction buffer circuit 414.

Note that, it is also possible to constitute the apparatus so that the buffer control circuit 410 further monitors the amount of the audio and/or visual data stored in the reproduction buffer circuit 414 and the recording buffer circuit 412 and controls the MO disc device 32 so as to hold the amount to a predetermined

value or more to prevents an underflow.

Figure 5 is a view showing the configuration of the tape running system of the VTR device 12 shown in Fig. 1 and Fig. 3.

As shown in Fig. 5, the tape running system of the VTR device 12 is constituted by a mechanical system 120, a drum control system 122, a capstan driving system 124, a reel motor driving system 126, and a system control circuit 128.

The mechanical system 120 is constituted by a drum motor, a feed (supply) side reel, a rewinding (take-up) side reel, a capstan motor, a pinch roller, and a control (CTL) head.

The mechanical system 120 is driven by the drum control system 122, the capstan driving system 124, and the reel motor driving system 126, feeds out the video tape 110, and makes the video tape run on the side surface of the drum on which the recording head and the reproduction head are arranged.

The drum control system 122 is constituted by a drum speed detection sensor, a drum phase detection sensor, a drum speed error detection circuit, a drum speed reference signal generation circuit, a drum phase error detection circuit, and a drum motor driving amplifier and controls the rotation of the drum.

The capstan driving system 124 is constituted by a capstan speed detection sensor, a capstan phase detection sensor, a capstan speed error detection circuit, a capstan speed reference signal generation circuit, a capstan phase error detection and a capstan motor driving amplifier and controls the rotation of the capstan.

The reel motor driving system 126 is constituted by two reel motor speed detection sensors, a reel speed error detection circuit, a tension sensor, a tension error detection circuit, a mode control circuit, and a reel motor driving amplifier and controls the rotation of the reel motor.

The system control circuit 128 synchronizes the operations of the drum control system 122, the capstan driving system 124, and the reel motor driving system 126 according to the control of the control circuit 50 (Fig. 1 and Fig. 3) and performs control so that the rotations of the drum motor of the mechanical system 120, the capstan, and the reel motor are always synchronized.

The system control circuit 128 makes the drum control system 122, the capstan driving system 124, and the reel motor driving system 126 operate in synchronization, whereby even in a case where the rotational speeds of the drum motor, capstan, and reel motor are changed, the relationship between the feed of the video tape 110 and

the rotational speed of the drum can be held constant, and as shown in Fig. 2, the track on the video tape 110 can be followed.

Figure 6 is a view showing the configuration of the MO disc device 32 shown in Fig. 1 and Fig. 3.

As shown in Fig. 6, the MO disc device 32 is constituted by an optical system 320, a system control circuit 350, a tracking servo circuit 354, a focus servo circuit 356, a radial servo circuit 358, a disc servo circuit 360, and a spindle motor 370.

The optical system 320 is constituted by a fixed portion 322 and a movable portion 340.

The fixed portion 322 is constituted by an HF superimposing circuit 324, a laser diode 326, prisms 328 and 330, a photodiode 332, and a preamplifier 334.

The movable portion 340 is constituted by a prism 342 and a lens system 344.

The system control circuit 350 controls the operation of the constituent parts of the MO disc device 32 according to an operation control signal BC input from the buffer control circuit 410 and the control from the control circuit 50.

Where the audio and/or visual data is recorded on the MO disc 300, the recording signal is input from the channel modulation and decoding circuit 36 to the laser

control circuit 34. The laser control circuit 34 produces a drive signal for driving the laser diode 326 based on the recording signal.

The HF superimposing circuit 324 superimposes the high frequency signal (HF) on the drive signal, and the laser diode 326 irradiates the laser beam on which the high frequency signal is superimposed to the MO disc 300 via the movable portion 340 to record the recording signal (audio and/or visual data) on the MO disc 300.

Where audio and/or visual data is reproduced from the MO disc 300, the laser control circuit 34 produces a drive signal for generating a laser beam for reproduction.

The HF superimposing circuit 324 superimposes the high frequency signal (HF) on the drive signal, and the laser diode 326 irradiates the laser beam for reproduction to the MO disc 300 via the movable portion 340. The photodiode 332 detects the laser beam containing the recording signal which was reflected at the MO disc 300 and returned via the movable portion 340, converts the same to an electrical RF signal, and outputs the same to the RF circuit 372.

The RF circuit 372 performs the equalization processing etc. with respect to the RF signal and outputs the resultant signal as the recording signal to the

channel modulation and decoding circuit 36.

Below, an explanation will be made of the operation of the data recording and reproducing apparatus 1 by paying attention to the route of the audio and/or visual data in the data recording and reproducing apparatus 1 shown in Fig. 3 (signal route).

First signal route

The audio and/or visual data which was input to the A/D conversion circuit 240 of the video IF circuit 24 and converted to the digital format is input to the signal processor 20.

The TBC buffer circuit 200 of the signal processor 20 performs the jitter correction of the input audio and/or visual data and outputs the resultant data to the MPEG processing circuit 204 via the selector circuit 202. The MPEG processing circuit 204 compresses and encodes the input audio and/or visual data by the MPEG 2 system and outputs the resultant data to the ECC encoder 180 of the ECC circuit 18.

The ECC encoder 180 of the ECC circuit 18 adds the ECC to the compressed and encoded audio and/or visual data. The audio and/or visual data to which the ECC was added is input to the VTR device 12 via the channel modulation and decoding circuit 16 and the REC amplifier 14 and recorded on the video tape 110.

In this way, the VTR device 12 can record the audio and/or visual data input from the video IF circuit 24.

Second signal route

The audio and/or visual data which was input to the signal processor 20 via the S/P conversion circuit 440 of the digital IF circuit 44 and subjected to the predetermined processing is output to the VTR device 12 via the ECC encoder 180 of the ECC circuit 18, the CCE circuit 160 of the channel modulation and decoding circuit 16, and the recording amplifier 140 of the REC amplifier 14 in the same way as the audio and/or visual data input to the A/D conversion circuit 240, which was explained referring to the first signal route.

The VTR device 12 rotates the drum motor, the capstan motor, and the reel motor at a rotational speed in accordance with the transmission data rate of the digital IF circuit 44 according to the control of the control circuit 50 and records the data on the video tape 110.

In this way, the VTR device 12 can record the audio and/or visual data input from the digital IF circuit 44 on the video tape 110 at the same recording data rate as the transmission data rate of the communication line etc. connected to the digital IF circuit.

Third signal route

The audio and/or visual data DIN input from the

communication line connected to the S/P conversion circuit 440 of the digital IF circuit 44 at the predetermined transmission data rate is input to the D/A conversion circuit 242 of the video IF circuit 24 after passing through the signal processor 20.

The D/A conversion circuit 242 converts the input audio and/or visual data to an audio and/or visual signal of the analog format and displays the same on for example the monitor device connected to the D/A conversion circuit 242.

In this way, the audio and/or visual data DIN input to the S/P conversion circuit 440 is converted to the audio and/or visual data AOUT by the D/A conversion circuit 242 and output and displayed on the device etc., whereby monitoring of the audio and/or visual signal transmitted via the communication line or monitoring of the camera become possible.

Fourth signal route

The VTR device 12 rotates the drum motor, the capstan motor, and the reel motor in accordance with the required reproduction data rate according to the control of the control circuit 50 and reproduces the recording signal from the video tape 110. Further, the VTR device 12 outputs the reproduced recording signal to either of the reproduction amplifier 142 or 144 of the REC amplifier

14.

The recording signal amplified at the REC amplifier 14 is regarded as audio and/or visual data by either of the CCD circuit 162 or 164 of the channel modulation and decoding circuit 16, subjected to buffering processing as shown in Fig. 4 by the selector circuit 402 of the data transfer circuit 40, the recording buffer circuit 412, and the buffer control circuit 410, and output to the ECC circuit 38.

The ECC encoder 380 of the ECC circuit 38 adds the ECC to the input audio and/or visual data, which is modulated by the CCE circuit 362 of the channel modulation and decoding circuit 36, and output it as the recording signal to the MO disc device 32. The MO disc device 32 records the input recording signal on the MO disc 300.

In this way, the MO disc device 32 can record the audio and/or visual data reproduced from the video tape 110 by the VTR device 12 on the MO disc 300.

Fifth signal route

The MO disc device 32 reproduces the recording signal from the MO disc 300 and outputs the reproduced signal to the CCD circuit 364 of the channel modulation and decoding circuit 36 via the laser control circuit 34. The CCD circuit 364 demodulates the audio and/or visual data

from the recording signal, and the ECC decoder 382 of the ECC circuit 38 performs the error correction processing with respect to the audio and/or visual data and outputs the resultant signal to the reproduction buffer circuit 414 of the data transfer circuit 40.

The buffer control circuit 410 and the reproduction buffer circuit 414 perform the buffering processing for the input audio and/or visual data as shown in Fig. 4 and output the same to the P/S conversion circuit 442 of the digital IF circuit 44 via the selector circuit 404 and the video processor circuit 420. The P/S conversion circuit 442 outputs the audio and/or visual data DOUT to the connected communication line.

At this time, the buffer control circuit 410 of the data transfer circuit 40 controls also the operation of the MO disc device 32 as shown in Fig. 4 to make the same to perform the reproduction operation in accordance with the transmission data rate for output to the outside apparatus.

In this way, the audio and/or visual data reproduced by the MO data recording and reproducing device 32 can be transmitted to the communication line connected to the P/S conversion circuit 442 of the digital IF circuit 44.

Sixth signal route

The MO disc device 32 reproduces the recording signal

from the MO disc 300 and outputs the reproduced signal to the channel modulation and decoding circuit 36 via the laser control circuit 34.

The CCD circuit 364 of the channel modulation and decoding circuit 36 demodulates the audio and/or visual data from the recording signal and outputs the resultant signal to the reproduction buffer circuit 414 of the data transfer circuit 40 via the ECC circuit 38 and the ECC decoder 382.

The buffer control circuit 410 and the reproduction buffer circuit 414 perform the buffering processing for the input audio and/or visual data as shown in Fig. 4 and outputs the resultant signal to the ECC encoder 180 of the ECC circuit 18 via the selector circuit 202 of the signal processor 20 and the MPEG processing circuit 204.

The ECC encoder 180 adds the ECC to the audio and/or visual data and outputs the resultant data to the VTR device 12 via the CCE circuit 160 of the channel modulation and decoding circuit 16 and the recording amplifier 140 of the REC amplifier 14.

The VTR device 12 rotates the drum motor, capstan motor, and reel motor at the rotational speed in accordance with the required recording data rate according to the control of the control circuit 50 and records the audio and/or visual data on the video tape

110.

In this way, the VTR device 12 can record the audio and/or visual data reproduced from the MO disc 300 by the MO disc device 32 on the video tape 110.

Seventh signal route

The audio and/or visual data which was input to the signal processor 20 via the S/P conversion circuit 440 of the digital IF circuit 44 or the A/D conversion circuit 240 of the video IF circuit 24 and subjected to the predetermined processing is input to the recording buffer circuit 412.

The buffer control circuit 410 and the recording buffer circuit 412 perform the buffering processing shown in Fig. 4 with respect to the input audio and/or visual data and output the resultant data to the CCE circuit 362 of the channel modulation and decoding circuit 36 via the ECC encoder 380 of the ECC circuit 38.

The CCE circuit 362 modulates the input audio and/or visual data to produce the recording signal and outputs the same to the MO disc device 32 via the laser control circuit 34.

The MO disc device 32 records the recording signal input from the laser control circuit 34 on the MO disc 300.

In this way, the MO disc recording and reproducing

device 32 can record the audio and/or visual data input from the outside apparatus via the A/D conversion circuit 240 of the video IF circuit 24 or the S/P conversion circuit 440 of the digital IF circuit 44 on the MO disc 300.

Note that, the audio and/or visual data output from the video processor circuit 420 can be transmitted also to the transmission path of the SDI system via the SDI input circuit 462.

Moreover, also the audio and/or visual data input from the transmission path of the SDI system etc. via the SDI input circuit 462 is recorded by the VTR device 12 and the MO disc device 32 or can be output from the D/A conversion circuit 242 and the P/S conversion circuit 442.

As mentioned above, by giving the configuration as shown in Fig. 3 to the data recording and reproducing apparatus 1 according to the present invention, the input/output and recording and reproduction of the audio and/or visual data can be carried out at any data rate among any elements selected from among the VTR device 12, the MO disc device 32, and the outside apparatus (communication line, monitor device, the transmission path of the SDI system, etc.).

As mentioned above, according to the data recording

and reproducing apparatus according to the present invention, a plurality of VTR devices are not required in the editing work of the audio-video data and the audio-video data can be easily edited at the camera site.

Also, the data recording and reproducing apparatus of the present invention has a simple configuration and is low in cost even though it has a variable recording and reproduction data rate and transmission data rate.

Also, according to the data recording and reproducing apparatus of the present invention, it is possible to enhance the efficiency of the editing work by improving the transfer data rate when a plurality of audio and/or visual data are connected to one audio and/or visual data.

Also, the data recording and reproducing apparatus of the present invention can transmit the audio and/or visual data obtained as a result of editing at a plurality of transmission data rates and has little restriction in the method of transmission.

What is claimed is:

1. A data recording and reproducing apparatus comprising:

a disc recording and reproducing means;

a tape recording and reproducing means;

a data transfer means;

a first input/output means, and

a second input/output means,

said disc recording and reproducing means, said tape recording and reproducing means, said data transfer means, said first input/output means, and said second input/output means being integrally assembled;

said disc recording and reproducing means recording audio-visual data, which comprises audio and visual data, audio data or visual data, transferred from said data transfer means in a disc recording medium to which random access is possible and reproduces said audio-visual data from said disc recording medium and outputs the same to said data transfer means;

said tape recording and reproducing means recording said audio-visual data transferred from said data transfer means in said tape recording medium and reproduces said

audio-visual data from said tape recording medium and outputs the same to said data transfer means;

said data transfer means transferring said audio-visual data among any of the elements selected from among said disc recording and reproducing means, said tape recording and reproducing means, said first input/output means, and said second input/output means;

said first input/output means receiving an analog audio-visual signal from an outside apparatus, converting the same to audio-visual data of a digital format, and outputting the same to said data transfer means and converting said audio-visual data transferred from said data transfer means to an audio-visual signal of the analog format and outputs the same to an outside apparatus; and

said second input/output means receiving audio-visual data from a communication line connected to an outside apparatus and outputs the same to said data transfer means and outputs said audio-visual data transferred from said data transfer means to a communication line connected to an outside apparatus.

2. A data recording and reproducing apparatus as set forth in claim 1, wherein

said disc recording and reproducing means records audio-visual data which was reproduced from said tape recording medium by said tape recording and reproducing means and transferred by said data transfer means and said audio-visual data which was received by said first input/output means and said second input/output means and transferred by said data transfer means in said disc recording medium and

said tape recording and reproducing means records said audio-visual data which was reproduced from said disc recording medium by said disc recording and reproducing means and said audio-visual data which was received by said first input/output means and said second input/output means and transferred by said data transfer means in said tape recording medium.

3. A data recording and reproducing apparatus as set forth in claim 1, wherein

said data transfer means has:

an input buffering means performing the buffering of said audio-visual data input from said disc recording and reproducing means;

an output buffering means performing the buffering

of said audio-visual data which is transferred to said disc recording and reproducing means; and

a recording and reproduction control means controlling each of the reproduction operation and recording operation of said disc recording and reproducing means in accordance with respective remaining recording capacities of the input buffering means and said output buffering means.

4. A data recording and reproducing apparatus as set forth in claim 3, wherein

said recording and reproduction control means starts the reproduction operation of said disc recording and reproducing means where the remaining storage capacity of the input buffering means becomes larger than a predetermined value and stops the reproduction operation of said disc recording and reproducing means where the remaining storage capacity of said input buffering means becomes a predetermined value or less.

5. A data recording and reproducing apparatus as set forth in claim 4, wherein

said tape recording means reproduces said audio-visual data at the data rate with which said data transfer means receives said audio-visual data and records said

audio-visual data at the data rate with which the data transfer means transfers said audio-visual data.

6. A data recording and reproducing apparatus as set forth in claim 1, wherein said first input/output means has:

a digital/analog conversion means for converting said audio-visual data of a digital format from said data transfer means to an audio-visual signal of an analog format and outputting the same to an outside apparatus and

an analog/digital conversion means for converting an audio-visual signal of an analog format from an outside apparatus to audio-visual data of a digital format and outputting the same to said data transfer means.

7. A data recording and reproducing apparatus as set forth in claim 1, wherein said second input/output means has:

a data output means for converting audio-visual data of a parallel format from the data transfer means to audio-visual data of a serial format and outputting the same to a predetermined communication line of the outside apparatus and

a data reception means for receiving audio-visual data of a serial format from a predetermined communication

line of an outside apparatus and converting the same to audio-visual data of a parallel format and outputting the same to said data transfer means.

DATA RECORDING AND REPRODUCING APPARATUS

ABSTRACT OF The DISCLOSURE

A data recording and reproducing apparatus which can easily perform the editing of audio and/or visual data even at the camera site. In the data recording and reproducing apparatus, a VTR portion and an MO disc portion are integrally constituted. Audio and/or visual data input from an outside apparatus is recorded on a video tape by the VTR portion, and further reproduced from the video tape and transferred to the MO disc device at a high speed and recorded. The user of the data recording and reproducing apparatus quickly finds the desired video image by actively utilizing the random access property of the MO disc device and sequentially inputs the same to the VTR device, records the same on the video tape, and performs the editing of the audio and/or visual data.

Express Mail Number TB823532485US

SONY-P5757

Declaration and Power of Attorney For Patent Application

特許出願宣言書

Japanese Language Declaration

私は、下欄に氏名を記載した発明者として、以下のとおり宣言する：

As a below named inventor, I hereby declare that:

私の住所、郵便の宛先および国籍は、下欄に氏名に続いて記載したとおりであり、

My residence, post office address and citizenship are as stated below next to my name,

名称の発明に関し、請求の範囲に記載した特許を求める主題の本来の、最初にして唯一の発明者である（一人の氏名のみが下欄に記載されている場合）か、もしくは本来の、最初にして共同の発明者である（複数の氏名が下欄に記載されている場合）と信じ、

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

" DATA RECORDING AND REPRODUCING APPARATUS "

その明細書を
(該当する方に印を付す)

the specification of which
(check one)

☐ ここに添付する。

☐ is attached hereto.

☒ 日に出願番号 第 08/563,188 号として提出し、

☒ was filed on November 27, 1995 as Application Serial No. 08/563,188

☐ 日に補正した。
(該当する場合)

and was amended on _____
(if applicable)

私は、前記のとおり補正した請求の範囲を含む前記明細書の内容を検討し、理解したことを陳述する。

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

私は、連邦規則法典第37部第1章第56条（a）項に従い、本願の審査に所要の情報を開示すべき義務を有することを認める。

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

SONY-P5757

Japanese Language Declaration

私は、合衆国法典第35部第119 条にもとづく下記の外国特許出願または発明者証出願の外国優先権利益を主張し、さらに優先権の主張に係わる基礎出願の出願日前の出願日を有する外国特許出願または発明者証出願を以下に明記する：

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior foreign applications
先の外国出願

(Number) (番 号)	(Country) (国 名)	(Day Month Year Filed) (出願の年月日)	Priority claimed 優先権の主張 Yes あり	No なし
P06-293556	Japan	28 November 1994	☒	☐
			☐	☐
			☐	☐

私は、合衆国法典第35部第120 条にもとづく下記の合衆国特許出願の利益を主張し、本願の請求の範囲各項に記載の主題が合衆国法典第35部第112 条第１項に規定の態様で先の合衆国出願に開示されていない限度において、先の出願の出願日と本願の国内出願日またはＰＣＴ国際出願日の間に公表された連邦規則法典第37部第１章第56条（ａ）項に記載の所要の情報を開示すべき義務を有することを認める：

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

(Application Serial No.) (出願番号)	(Filing Date) (出願日)	(現 況) (特許済み、係属中、放棄済み)	(Status) (patented, pending, abandoned)

私は、ここに自己の知識にもとづいて行った陳述がすべて真実であり、自己の有する情報および信ずるところに従って行った陳述が真実であると信じ、さらに故意に虚偽の陳述等を行った場合、合衆国法典第18部第1001条により、罰金もしくは禁錮に処せられるか、またはこれらの刑が併科され、またかかる故意による虚偽の陳述が本願ないし本願に対して付与される特許の有効性を損うことがあることを認識して、以上の陳述を行ったことを宣言する。

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

SONY-P5757

Japanese Language Declaration

委任状：私は、下記発明者として、以下の代理人をここに選任し、本願の手続を遂行すること並びにこれに関する一切の行為を特許商標庁に対して行うことを委任する。
（代理人氏名および登録番号を明記のこと）

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. (*list name and registration number*)

I HEREBY APPOINT THE FOLLOWING AS MY ATTORNEYS WITH FULL POWER OF SUBSTITUTION TO PROSECUTE THIS APPLICATION AND TRANSACT ALL BUSINESS IN THE PATENT OFFICE CONNECTED THEREWITH:

Name	Registration Number	Name	Registration Number	Name	Registration Number
Karl A. Limbach	18,689	Neil A. Smith	25,441	Michael A. Stallman	29,444
George C. Limbach	19,305	Malcolm B. Wittenberg	27,028	James C. Weseman	30,507
John P. Sutton	22,430		27,755	Philip A. Girard	28,848
John K. Uilkema	20,282	Veronica Colby Devitt	29,375	Frank E. Johnston	16,061
J. William Wigert, Jr.	24,582	Ronald L. Yin	27,607	J. Thomas McCarthy	22,420
Philip M. Shaw, Jr.	25,376	Gerald T. Sekimura	30,103		
Slade E. Smith	37,447	Ted Naccarella	33,023	Alfred A. Equitz	30,922
Patricia Coleman James,	37,155	David Woycechowsky	39,079	Alan S. Hodes	38,185

書類の送付先：

Send Correspondence to:

Philip M. Shaw, Jr.
LIMBACH, LIMBACH & SUTTON
2001 Ferry Building
San Francisco, CA 94111
(415) 433-4150

直通電話連絡先：（名称および電話番号）

Direct Telephone Calls to: (*name and telephone number*)

Philip M. Shaw, Jr. (415) 433-4150

唯一のまたは第一の発明者の氏名	Full name of sole or first inventor: SHIGEAKI KOIKE
同発明者の署名　日付	Inventor's signature: Shigeaki Koike　Date: Feb. 29, 1996
住所	Residence: Kanagawa, Japan
国籍	Citizenship: Japan
郵便の宛先	Post Office Address: c/o Sony Corporation
7-35, Kitashinagawa 6-Chome, Shinagawa-ku, Tokyo, Japan	
第２の共同発明者の氏名（該当する場合）	Full name of second joint inventor, if any: YASUO IWASAKI
同第２発明者の署名　日付	Second inventor's signature: Yasuo Iwasaki　Date: Feb. 29, 1996
住所	Residence: Kanagawa, Japan
国籍	Citizenship: Japan
郵便の宛先	Post Office Address: c/o Sony Corporation
7-35, Kitashinagawa 6-Chome, Shinagawa-Ku, Tokyo, Japan	

（第六またはそれ以降の共同発明者に対しても同様な情報および署名を提供すること。）

(Supply similar information and signature for third and subsequent joint inventors.)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of	)	Group Art Unit: 2615
SHIGEAKI KOIKE ET AL.	)	Examiner: V. BOCCIO
Continuation of Application No. 08/563,188	)	LETTER TO THE OFFICIAL DRAFTSPERSON
Filed: September 3, 1997	)	2001 Ferry Building San Francisco, CA 94111 (415) 433-4150
For: DATA RECORDING AND REPRODUCING APPARATUS	)	

BOX PATENT APPLICATION
Honorable Commissioner of Patents
and Trademarks
Washington, D.C. 20231

Sir:

With the permission of the Examiner, please approve the proposed drawing changes noted in red on the enclosed sketch.

Respectfully submitted,

LIMBACH & LIMBACH L.L.P.

By: _____

Charles P. Sammut
Reg. No. 28,901

September 3, 1997
Our File: SONY-C5757

EXPRESS MAIL CERTIFICATE

I hereby certify that this correspondence and any documents referred to as enclosed herein are being deposited with the United States Postal Service on this date September 3, 1997, in an envelope bearing "Express Mail Post Office To Addressee" Mailing Label Number TB82353248XUS addressed to: Box Patent Application, Assistant Commissioner for Patents, Washington, D.C. 20231.

HOWARD WONG
(Name of person mailing paper)

(Signature)

FIG. 1

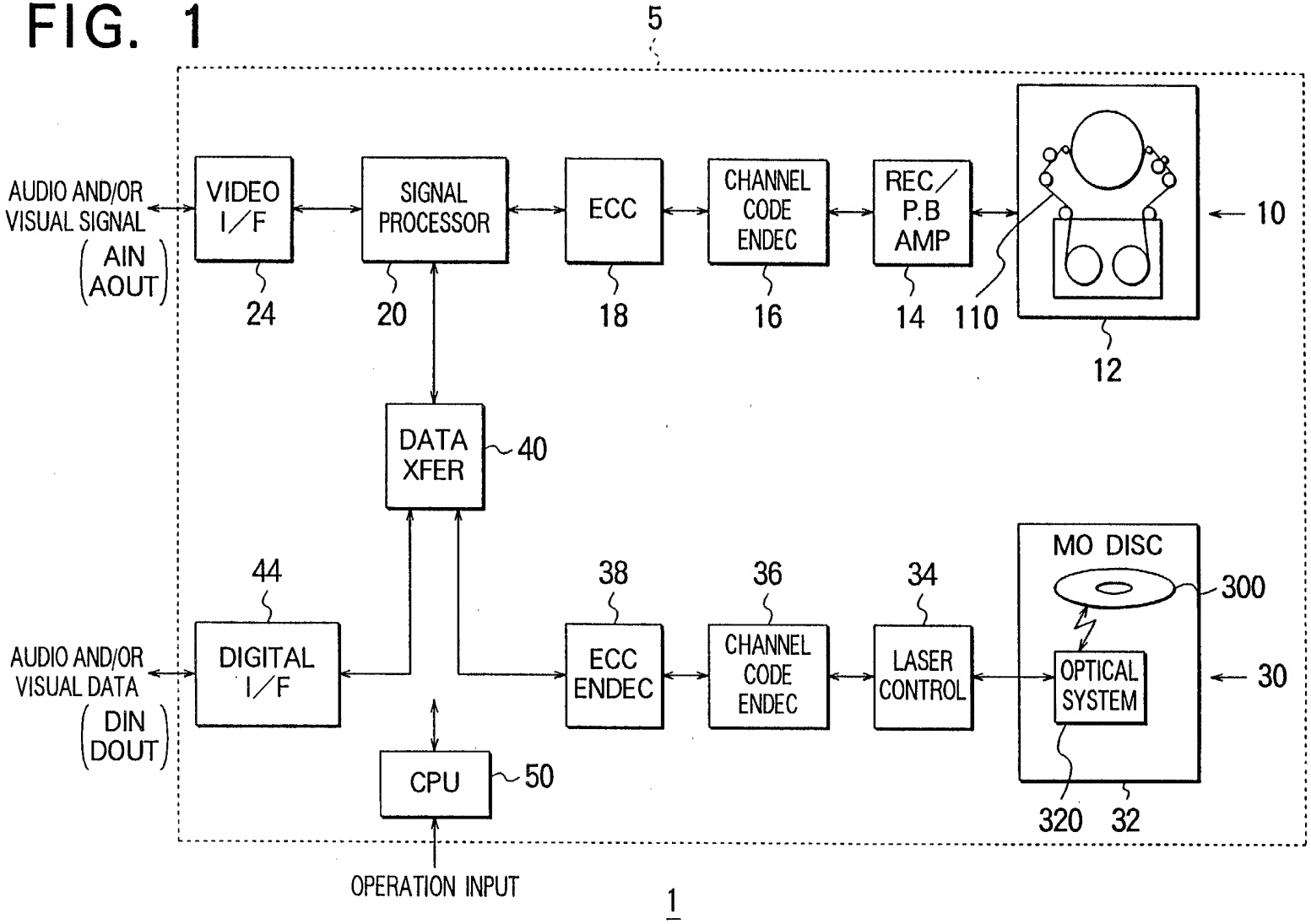

5
AUDIO AND/OR VISUAL SIGNAL
AIN
AOUT
VIDEO I/F
24
SIGNAL PROCESSOR
20
ECC
18
CHANNEL CODE ENDEC
16
REC/ P.B AMP
14
110
10
12
DATA XFER
40
44
DIGITAL I/F
AUDIO AND/OR VISUAL DATA
DIN
DOUT
38
ECC ENDEC
36
CHANNEL CODE ENDEC
34
LASER CONTROL
MO DISC
300
OPTICAL SYSTEM
30
320
32
CPU
50
OPERATION INPUT
1

FIG. 2

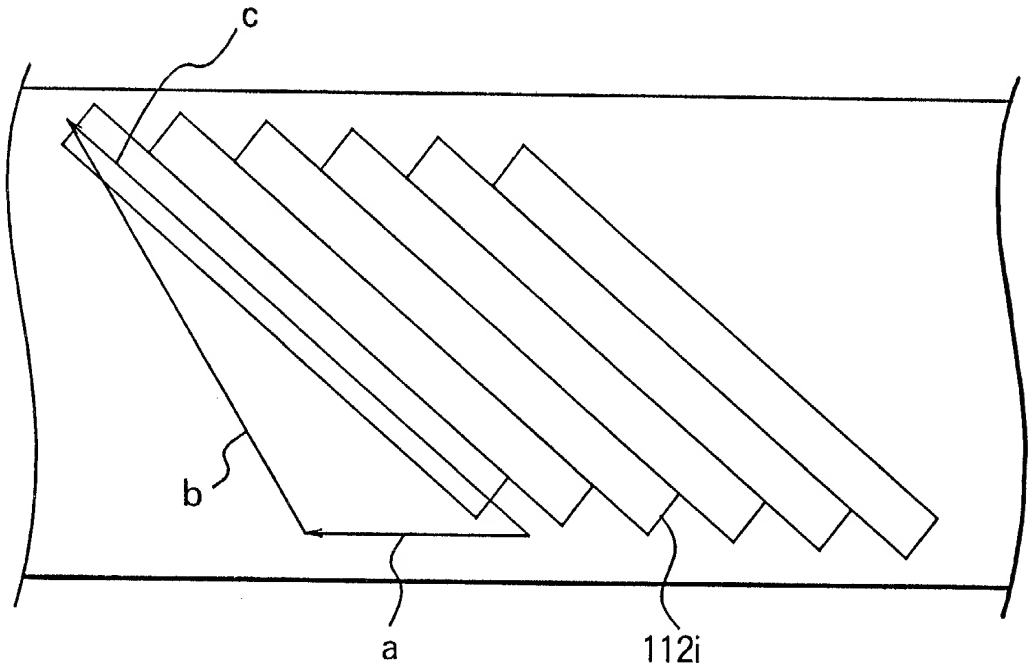


FIG. 3

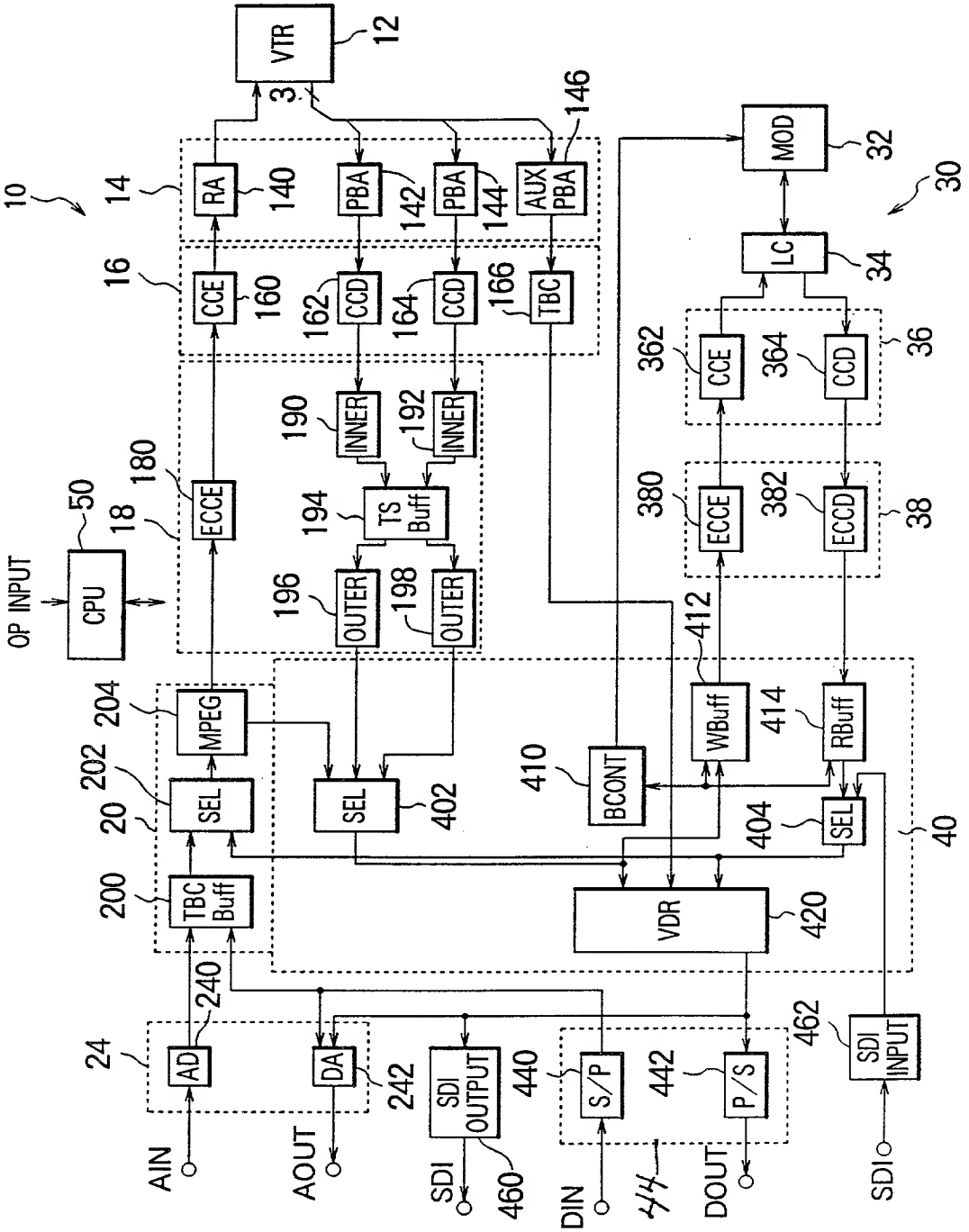

VTR
12
3
10
14
16
RA
140
PBA
142
PBA
144
AUX PBA
146
CCE
160
CCD
162
CCD
164
TBC
166
INNER
190
INNER
192
TS Buff
194
OUTER
196
OUTER
198
ECCE
180
CPU
50
18
OP INPUT
MPEG
204
SEL
202
20
SEL
402
TBC Buff
200
AD
240
24
DA
242
AIN
AOUT
SDI OUTPUT
440
SDI
460
S/P
DIN
442
P/S
DOUT
SDI INPUT
462
SDI
BCONT
410
VDR
420
WBuff
412
RBuff
414
SEL
404
40
MOD
32
30
LC
34
CCE
362
CCD
364
36
ECCE
380
ECCD
382
38

FIG. 4A

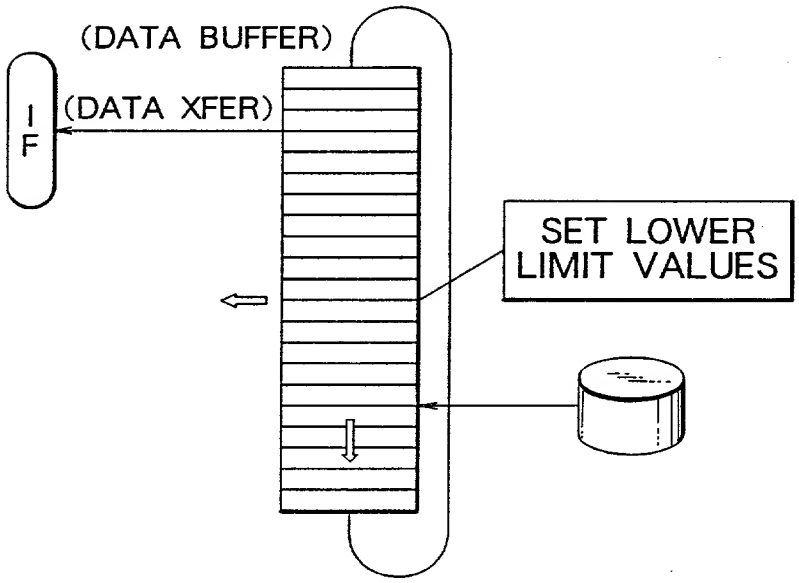

(DATA BUFFER)
I F
(DATA XFER)
SET LOWER LIMIT VALUES

FIG. 4B

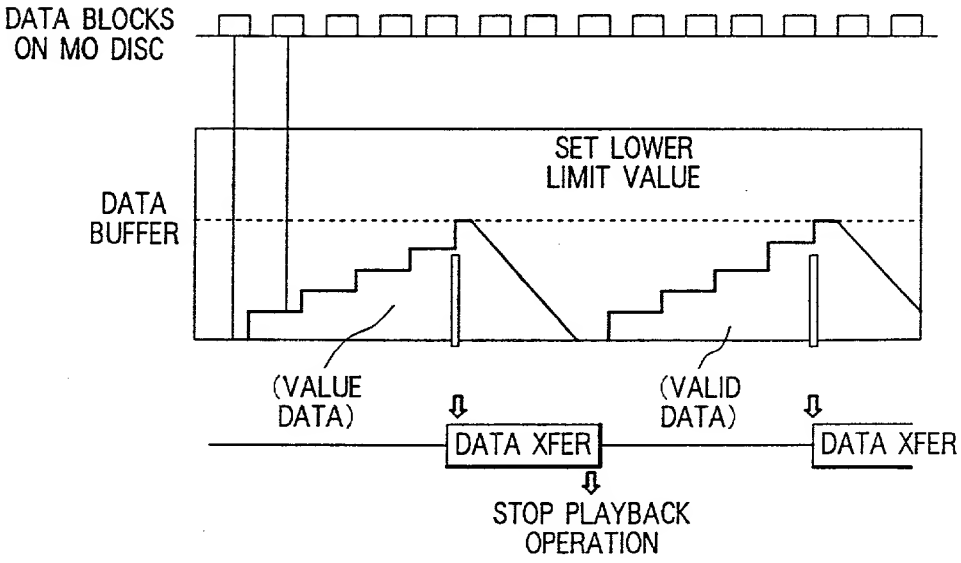

DATA BLOCKS ON MO DISC
SET LOWER LIMIT VALUE
DATA BUFFER
(VALUE DATA)
(VALID DATA)
DATA XFER
DATA XFER
STOP PLAYBACK OPERATION

FIG. 5

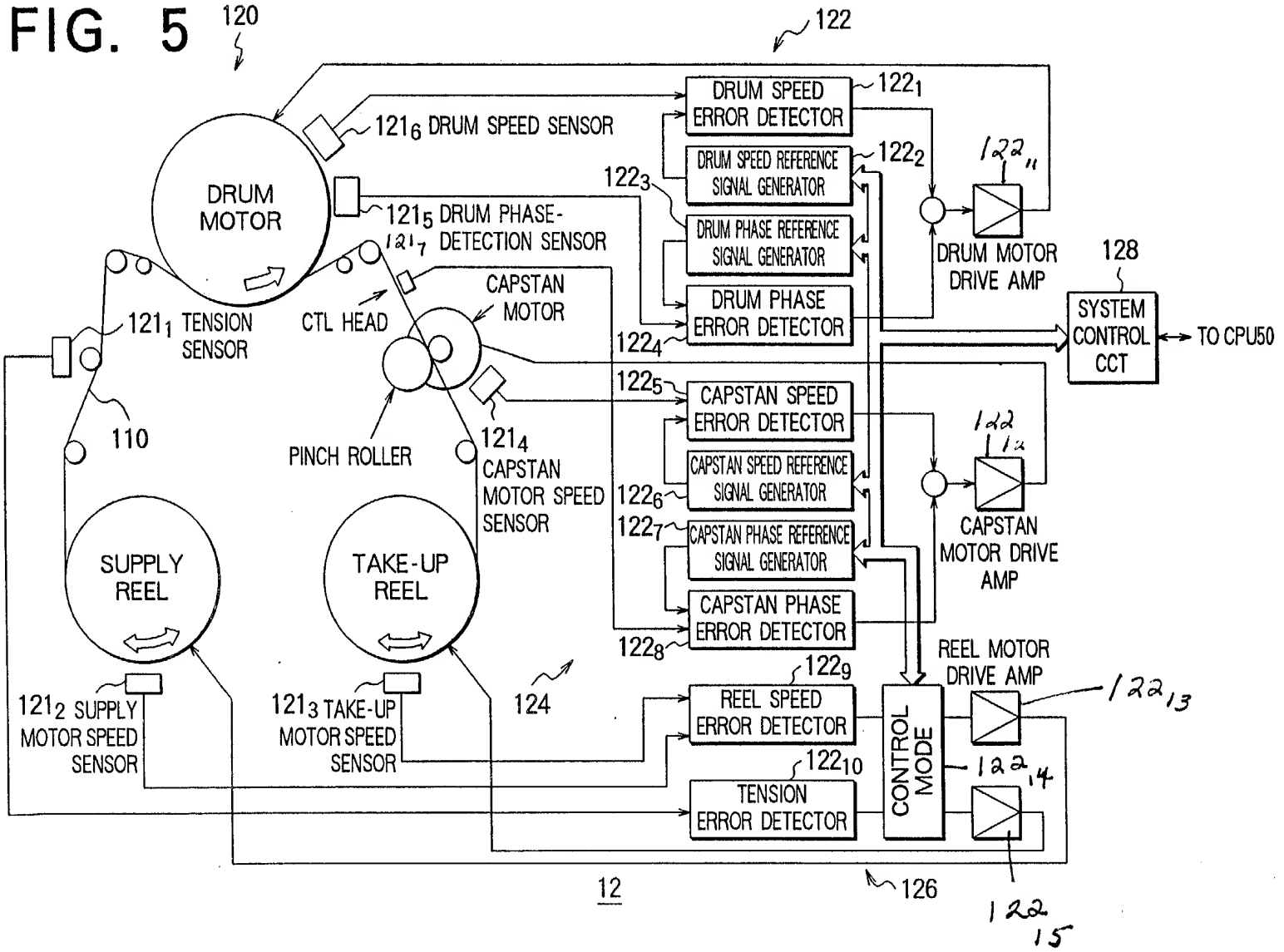
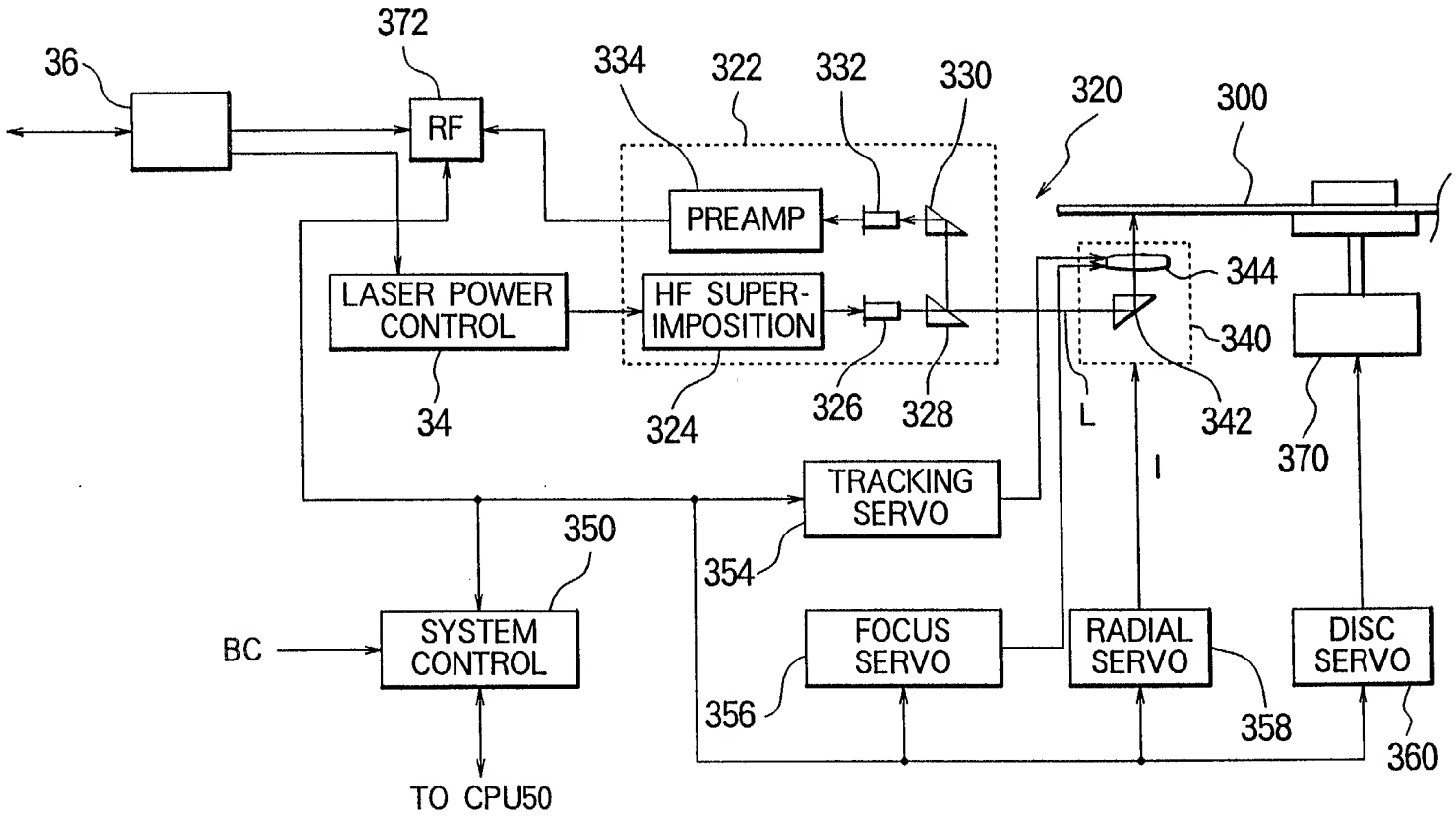


FIG. 6



【書類名】 図面

【図１】

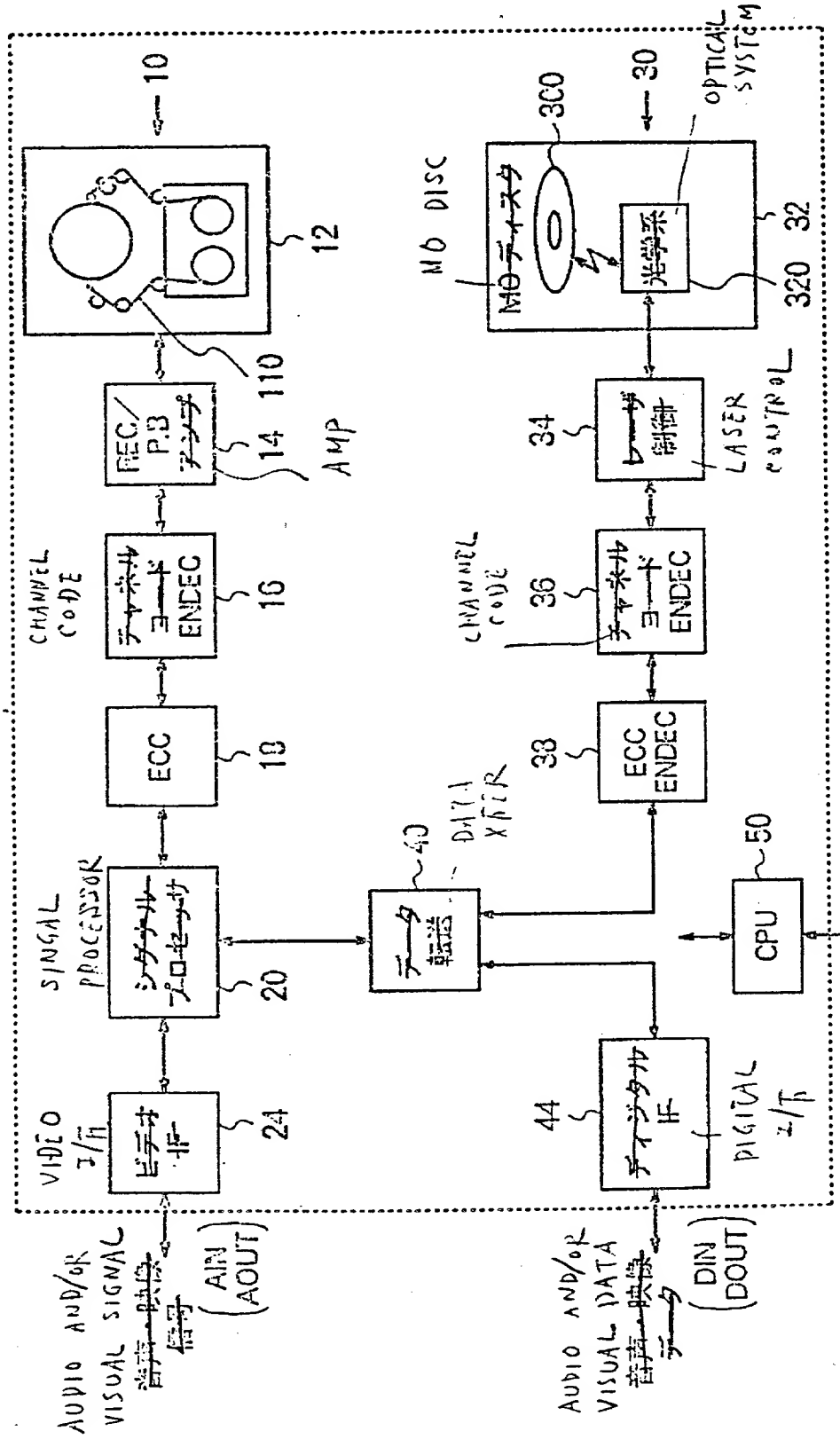
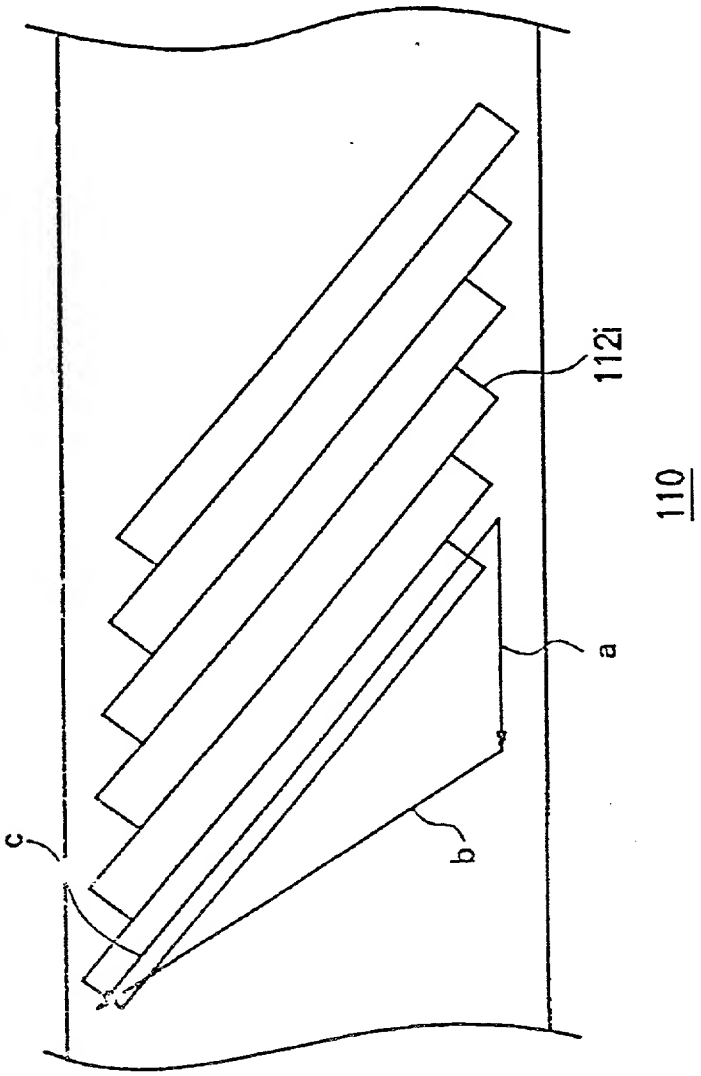


FIG.1

【図２】

FIG.2



【図３】

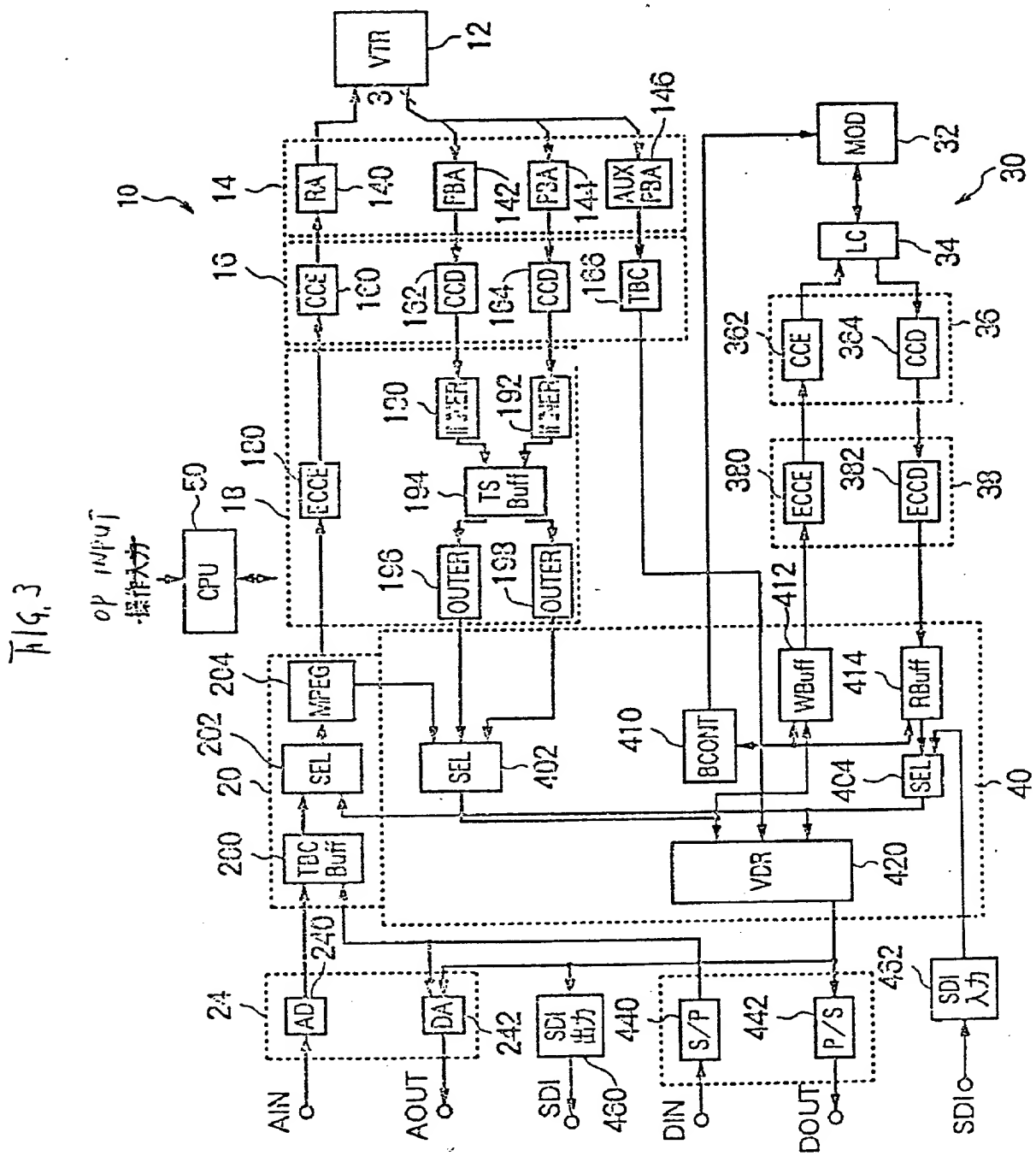

10
VTR
12
3
14
RA
140
FBA
142
P3A
141
AUX FBA
146
16
CCE
160
CCD
162
CCD
164
TBC
166
130
192
50
18
180
CPU
ECCE
194
TS Buff
196
OUTER
198
OUTER
412
204
MPEG
202
20
SEL
SEL
402
410
BCONT
WBuff
414
RBuff
200
TBC Buff
404
SEL
40
VDR
420
240
24
AD
DA
242
SDI 出力
440
S/P
442
P/S
432
SDI 入力
AIN
AOUT
SDI
460
DIN
DOUT
SDI
30
MOD
32
LC
34
362
CCE
364
CCD
35
380
ECCE
382
ECCD
38

FIG. 3

【図４】

FIG.4A

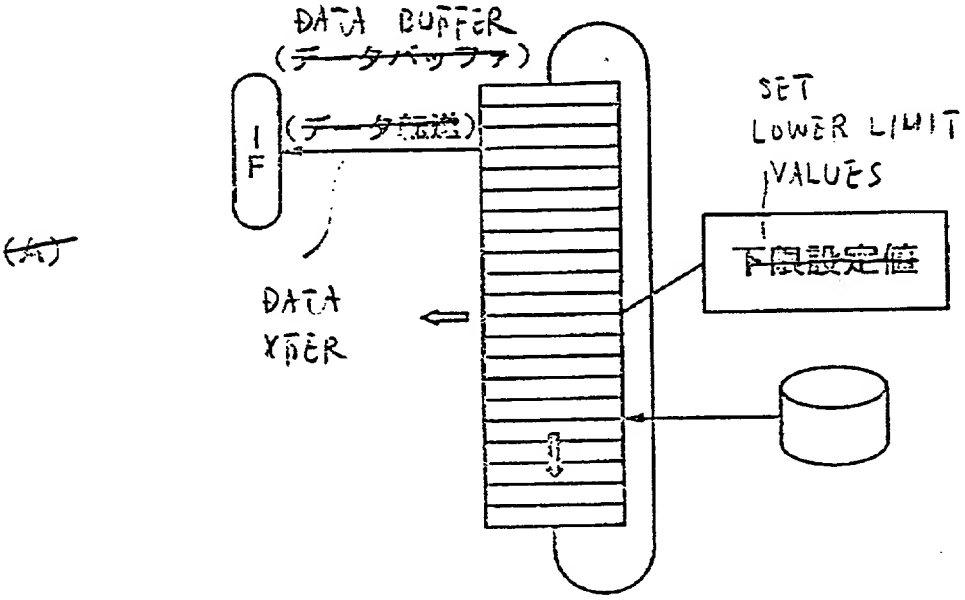
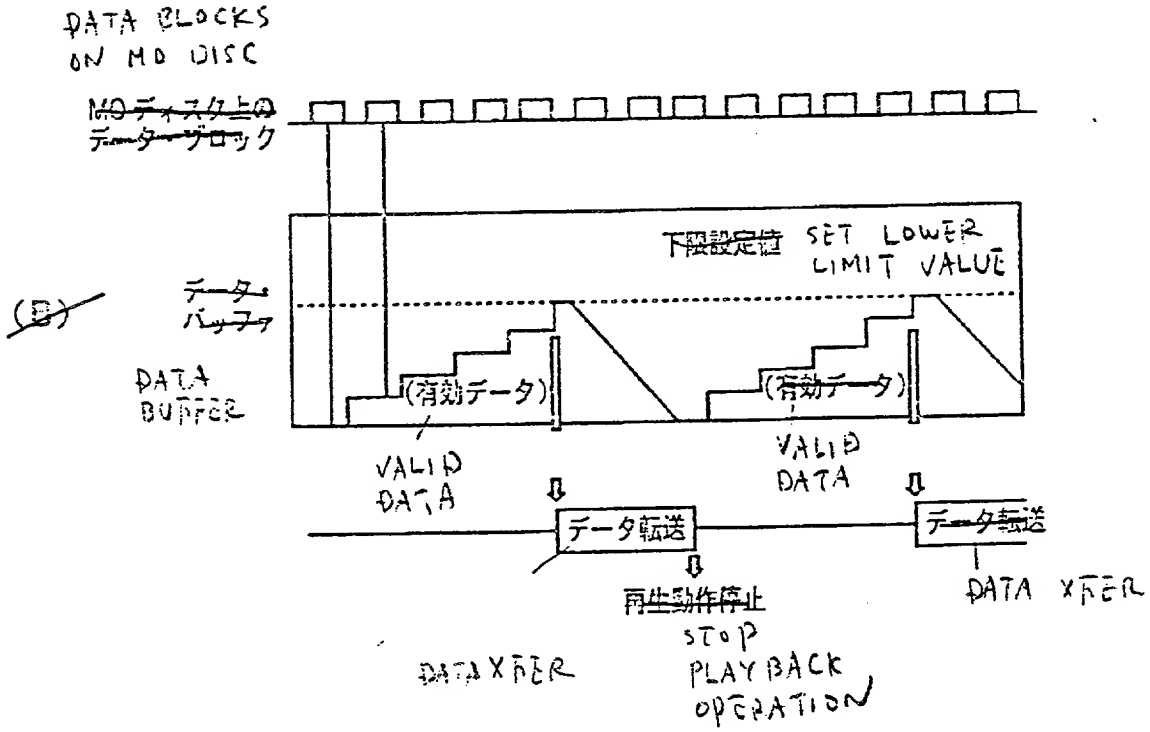
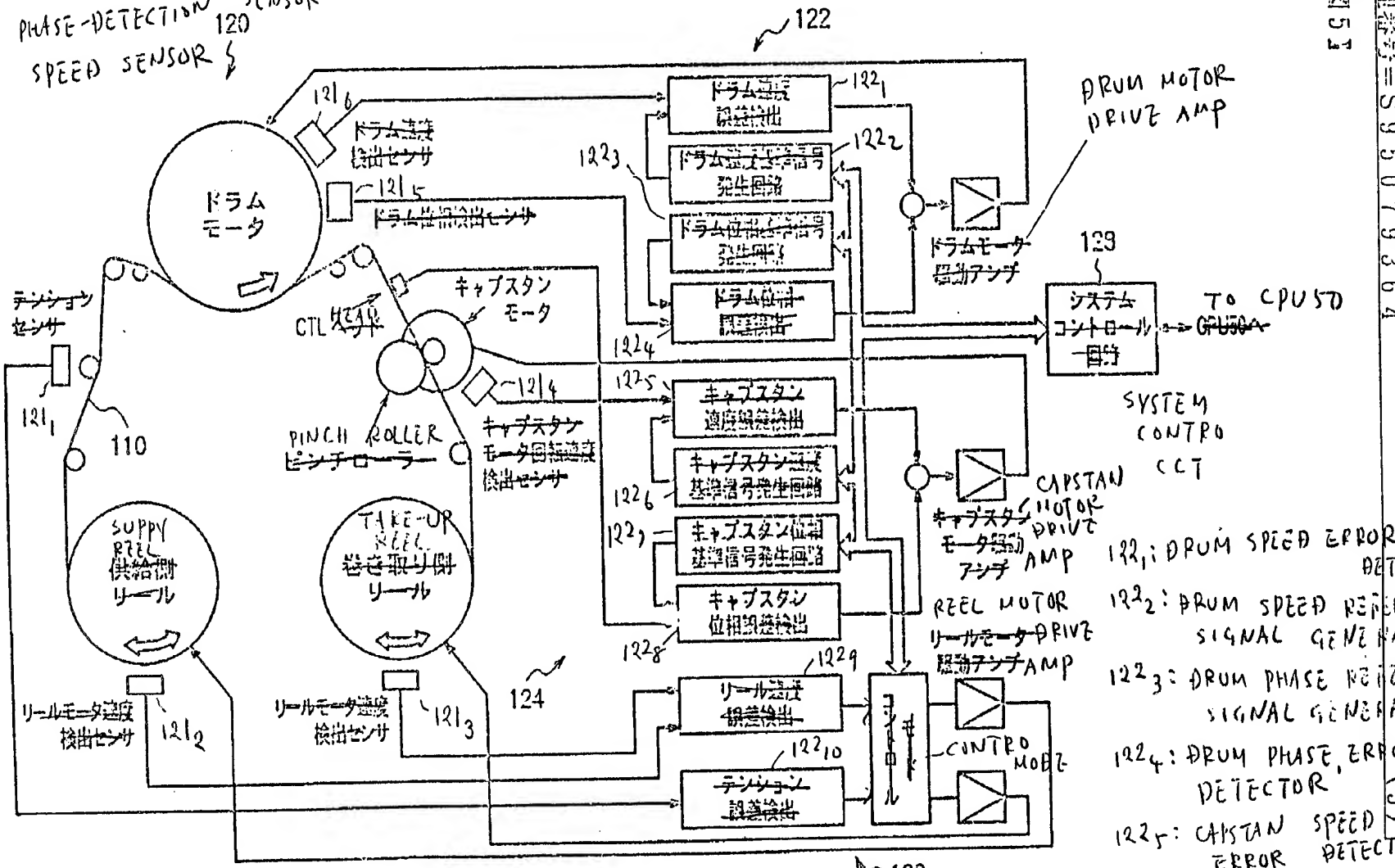


FIG.4B



121_1 : TENSION SENSOR
121_2 : SUPPLY MOTOR SPEED MOTOR
121_3 : TAKE-UP MOTOR SPEED MOTOR
121_4 : CAPSTAN MOTOR SPEED SENSOR
121_5 : DRUM PHASE-DETECTION SENSOR
121_6 : DRUM SPEED SENSOR

FIG. 5



122_1 : DRUM SPEED ERROR DETECTOR
122_2 : DRUM SPEED REFERENCE SIGNAL GENERATOR
122_3 : DRUM PHASE REFERENCE SIGNAL GENERATOR
122_4 : DRUM PHASE ERROR DETECTOR
122_5 : CAPSTAN SPEED ERROR DETECTOR
122_6 : CAPSTAN SPEED REFERENCE SIGNAL GENARATOR
122_7 : CAPSTAN PHASE REFERENCE SIGNAL GENARATOR
122_8 : CAPSTAN PHASE ERROR DETECTOR
122_9 : REEL SPEED ERROR DETECTOR
122_{10} : TENSION ERROR DETECTOR

図5

(5)

【図6】

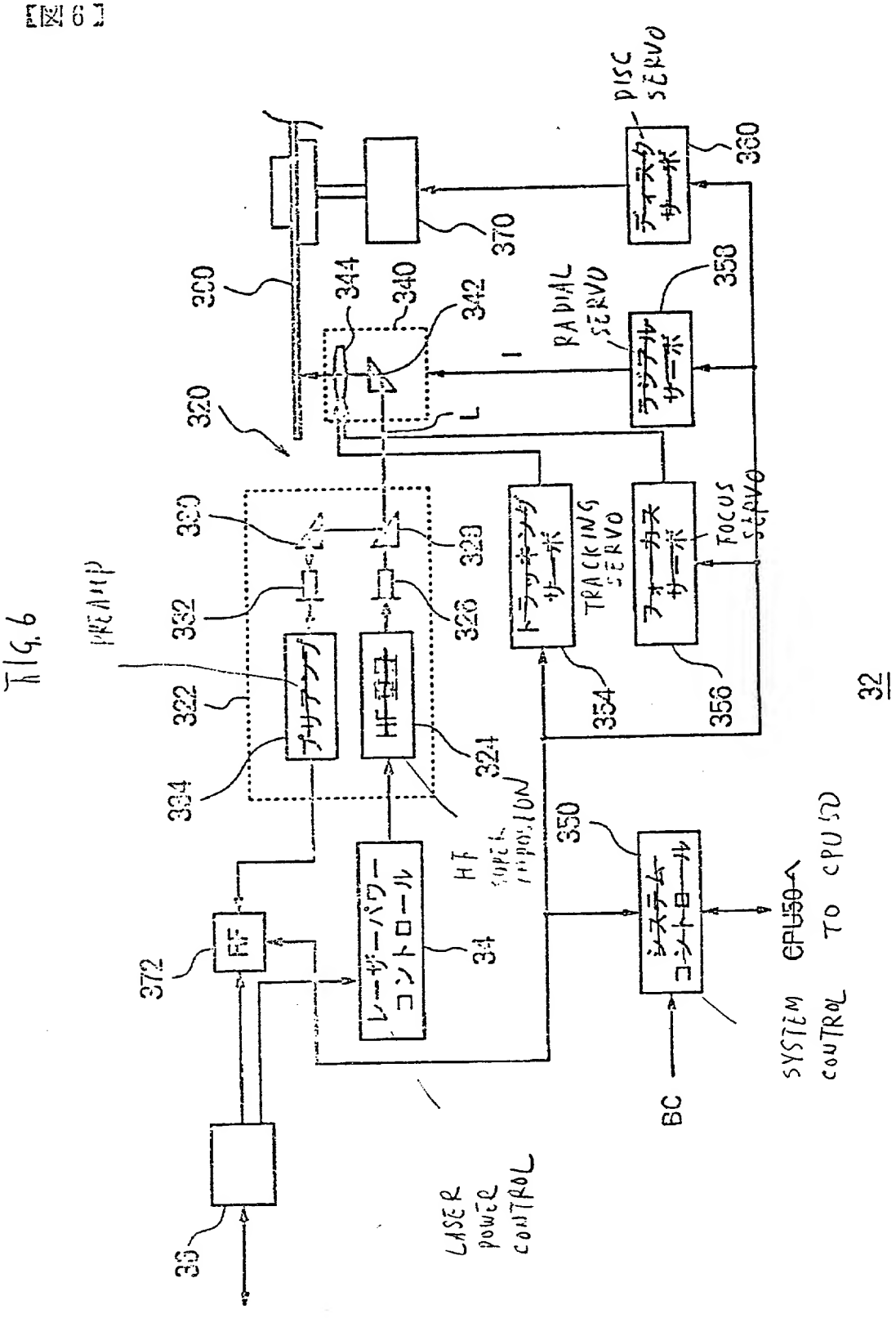


FIG. 6
PREAMP
RF
HF重畳
HF SUPERPOSITION
LASER POWER CONTROL
SYSTEM CONTROL
TO CPU 50
BC
TRACKING SERVO
FOCUS SERVO
RADIAL SERVO
DISC SERVO
L
I
30
32
34
320
322
323
324
326
328
330
332
334
340
342
344
350
354
356
358
360
370
372